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GRAVITY DATA PROCESSING PROGRAMS.(U)

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WOODS HOLE OCEANOGRAPHIC INSTITUTION
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GRAVITY DATA PROCESSING PROGRAMS

By

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TECHNICAL REPORT

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Approved for Distribution: John I. Ewing

John I. Ewing, Chairman
Department of Geology & Geophysics

ABSTRACT

A summary and documentation of a family of computer programs that have been developed by the gravity group at the Woods Hole Oceanographic Institution is presented. The programs provide for format conversion, computation of the regional gravity field from spherical harmonic coefficients, selective data retrieval, graphic display, and construction of two- and three-dimensional structure models and the computation of the gravitational attraction of those models.

GRAVITY DATA PROCESSING PROGRAMS

INTRODUCTION

This report is a summary and documentation of a family of computer programs that have been developed by the gravity group at the Woods Hole Oceanographic Institution. The programs documented here provide for format conversion, computation of the regional gravity field from spherical harmonic coefficients, selective data retrieval, graphic display, and construction of two- and three-dimensional structure models and the computation of the gravitational attraction of those models.

Many of the programs in this report have been used and modified for more than ten years. During this time six substantially different computer systems have been available to us. These are an Autonetics Recomp II, General Electric 225, IBM 7090 and 7094, IBM 1710 (shipboard), XDS Sigma-7, and Hewlett-Packard 2114, 2116, and 2100 (shipboard). Thus the programs have evolved not only because of changing needs and experience, but also because of different system hardware and software constraints. Artifacts reflecting this evolution are evident in some of the programs.

In the interpretation of gravity data and the creation of structure models of earth features, other geophysical and geological information is important. Gravity potential information alone does not define a unique mass distribution, and hence additional information is required to limit the possibilities. Therefore, we have added the capability for retrieving and displaying other types of data which are available in digital form. At the present time these data types include seismicity, seismic refraction profiles, and location of active volcanoes. The seismic refraction profiles are derived from a compilation of crustal seismic refraction profiles prepared by McConnel Jr. and McTaggart-Cowan of the University of Toronto in 1963 and from five supplements (No. 1 by Gupta and McTaggart-Cowan, 1964; No. 2 by Gertner, 1967; No. 3 by Gertner and Farquhar, 1968; No. 4 by Gertner and Farquhar, 1971; and No. 5 by Gertner and Farquhar, 1972). Supplements numbers 2 through 5 were sponsored by the Federation of Astronomical and Geophysical Services of I.C.S.U. Subsequent to the fifth supplement, financial assistance to the University of Toronto by U.N.E.S.C.O. for this compilation terminated, and unfortunately, this compilation effort has ceased. For our utilization of the seismic refraction compilation, we find a single record per refraction line a more convenient format than the one- or two-record format prepared by the University of Toronto. We prefer magnetic tape or disc for data storage and accordingly are not limited by the 80 character record length of punched cards. We have incorporated additional data as we have had particular needs.

The file of locations of active volcanoes was originally coded from the Catalogue of Active Volcanoes. Volcanoes on New Zealand were added from Thompson (1964), and those in Alaska and the Aleutian Arc were added from Foster et al. (1966) and Coats (1950). More recently, IAVCEI has prepared data sheets of the post-Miocene volcanoes of the world (IAVCEI, 1975). A deck of cards based on these data sheets was obtained in December 1975 from NGSDC.

Additional data types can be incorporated into our programs relatively easily. Location and certain other characteristics of Deep Sea Drilling Program (DSDP) drill hole sites is a file of interest. We hope that a source for a global compilation of seismic slip mechanisms might be found.

PROGRAMS

A diagram outlining the functions served by the programs documented in this report is given as Figure 1. This diagram serves as an index to the utilization of the family of programs, and it is intended to be largely self-explanatory. Table 1 lists the programs documented here and provides a summary statement of the purpose of each program. Table 1, together with figure 1, enables the reader to quickly find programs to meet his need.

Documentation for the programs themselves follows the references cited section. The programs are ordered alphabetically, and for each program the characteristics and operational parameters are described first, followed by a section containing listings of the source coding. Subroutines required by these programs are then given alphabetically in the section after the program listings. Standard system routines and those of a normal Fortran subroutine library are not reproduced. Normally, only a source listing is given for each subroutine.

ACKNOWLEDGMENTS

Documentation of programs is a tedious activity, which normally seems to be deferred, awaiting a less busy time. The less busy time is an elusive quantity that never seems to arrive, and in the interim more programs are written and old programs modified to meet new requirements. After awhile, the original programmer or the modifier often has moved on to other pastures and is no longer available to help with documentation. Although I firmly believe in the importance of documenting programs when they are written, I personally have not been very faithful to that belief. Thus the existence of this report is largely due to the efforts of others. I particularly want to thank Allin Folinsbee and Leon Gove for being far more rigorous than I in documenting their programming efforts, Julie Milligan for a major contribution in the early stages of preparation of this report, Carolyn Dean for her efforts in the later stages, and Nan Galbraith, Leon Gove and Christine Wooding for their help in its completion. Allin is now at the Bedford Institute of Oceanography, Halifax, Nova Scotia; Julie is at the University of Auckland in Auckland, New Zealand and Carolyn is teaching high school in Falmouth, Massachusetts.

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Table 1

PROGRAM DICTIONARY

ABSTGC - ABSTRACTS GCON data at a spacing of 10 nautical miles.

CHART - Plots data on Mercator charts

CHARTG - Plots GSUM data on Mercator charts. Much faster than CHART for GSUM data.

CONV67 - Converts gravity data at Potsdam system to IGSN71 and International Gravity Formula 1967.

CR2G - Converts land gravity meter counter readings to observed gravity.

CR2G67 - Like CR2G, but calculates anomalies referenced to International Gravity Formula 1967.

CRWT3 - Calculates the pressure at the base of a crustal column (Kg/cm^2).

DMABLK - Converts blocked DMA format data to blocked GSUM format data.

DMAP - Converts digitized position in inches to latitude and longitude.

DMOD - Punches digitized polygon points for crustal models digitized on a digitizing table.

GFLD1 - Calculates regional free-air gravity anomalies for a given region from spherical harmonic coefficients.

GFLD2 - Calculates regional free-air gravity anomalies from spherical harmonic coefficients entered at run time.

GRAFG2 - Plots one variable versus another.

GRAV1 - Converts data input at format of 8 July 1969 to GSUM format.

Table 1 (continued)

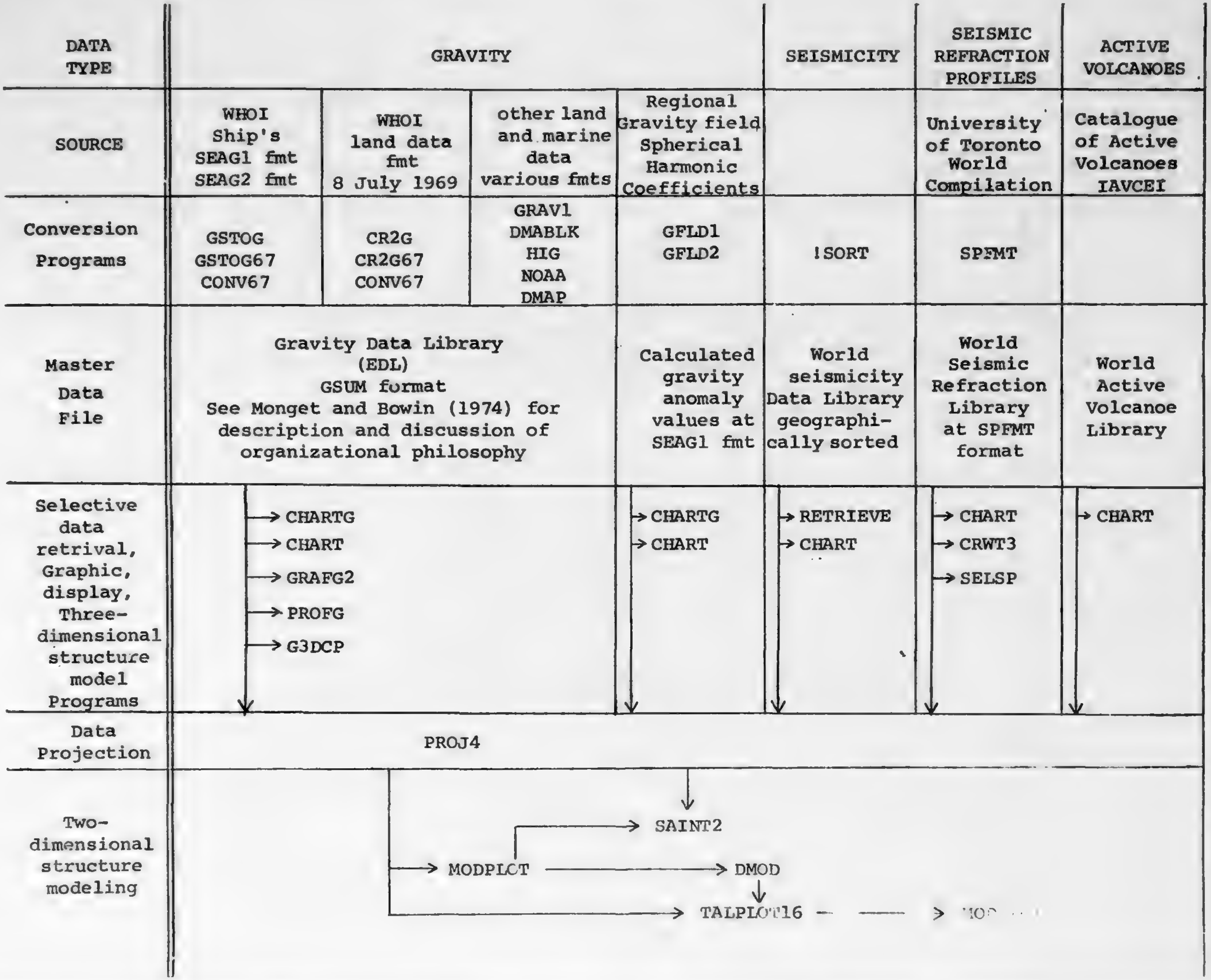
GSTOG	- Converts data input in SEAG1 or SEAG2 format to 128-character GSUM records.
GSTOG67	- Like GSTOG, but checks input for 1930 or 1967 gravity formula reference. Output referenced to 1967 International Gravity Formula.
G3DCP	- Computes gravity anomaly (for both flat and curved planetary surfaces), potential field (for flat survace), and mass per unit area for a set of polygonal laminae comprising a three-dimensional crustal structure model.
G3DCPREP	- Combines G3DCP input bodies into 1 file for processing.
HIG	- Converts gravity data in the format used by the Hawaii Institute of Geophysics (HIG) to GSUM format.
LSORT	- Checks laminae of G3DCP format for minimum thickness and counts them.
MODPLOT	- Plots data for preparation of structure models of the earth's crust and plots the output tapes from TALPLOT16.
NOAA	- Converts gravity data in NOAA format to WHOI GSUM format.
PROFG	- Profiles GSUM data
PROJ4	- Projects data onto a given line providing the data is within a given area and within a given distance from the line.
RETRIEVE	- System processor for retrieving data from data files.
SAINT2	- Interpolates data at even intervals.
SELSP	- Selects data output by the CRWT3 program on the basis of a given parameter.
SPFMT	- Converts seismic refraction column data in University of Toronto World Seismic Refraction Profile Compilation format to WHOI SPFMT format.
TALPLOT16	- Computes gravity anomalies and mass per unit area for a set of two-dimensional polygons.

TABLE 2

SUBROUTINES REQUIRED BY THE PRECEDING PROGRAMS:

ALDT
ANOV2
ANOV3
AREAK
CALSC
CDATE
CHGMT
COORR
DISAZ
DMTOR
DNAV
DREC
DY2M
ENDLT
EVIL
EXDT
FIND
FLD2
GETC
GETF
GETG
GETGA
GETGC
GETGS
GETH
GETL
GETM
GETP
GETS
GETST
GETV
GETX
GETY
GINOT
GINTF
GI67F
GRIDG
GRID2
INCEP
ISW(1)
M2DY
NAVIN
NAVOT
OBG
BLINE
PINOT
PLANET
PLOTA
RETBY
RTDM2
RTODM
SIMUL
SPLOT
SPOT
SPOT2
TIDAL
VETBY
WEIG2
YBLIKI
YBLIKO
YINOT

FIGURE 1



DATA TYPE	GRAVITY				SEISMICITY	SEISMIC REFRACTION PROFILES	ACTIVE VOLCANOES
SOURCE	WHOI Ship's SEAG1 fmt SEAG2 fmt	WHOI land data fmt 8 July 1969	other land and marine data various fmts	Regional Gravity field Spherical Harmonic Coefficients		University of Toronto World Compilation	Catalogue of Active Volcanoes IAVCEI
Conversion Programs	GSTOG GSTOG67 CONV67	CR2G CR2G67 CONV67	GRAV1 DMABLK HIG NOAA DMAP	GFLD1 GFLD2	!SORT	SPFMT	
Master Data File	Gravity Data Library (EDL) GSUM format See Monget and Bowin (1974) for description and discussion of organizational philosophy			Calculated gravity anomaly values at SEAG1 fmt	World seismicity Data Library geographically sorted	World Seismic Refraction Library at SPFMT format	World Active Volcanoe Library
Selective data retrival, Graphic, display, Three-dimensional structure model Programs	→ CHARTG → CHART → GRAFG2 → PROFG → G3DCP			→ CHARTG → CHART	→ RETRIEVE → CHART	→ CHART → CRWT3 → SELSP	→ CHART
Data Projection	PROJ4						
Two-dimensional structure modeling	SAINT2 → MODPLOT → DMOD TALPLOT16 → MO[illegible]						

REFERENCES CITED

Coats, R. R., Volcanic Activity in the Aleutian Arc, Geol. Surv. Bull., 974-B, 35-47, 1950.

Foster, H. L., R. B. Forbes, and D. M. Ragan, Granulite and Peridotite Inclusions from Prindle Volcano, Yukon-Tanana Upland, Alaska, U. S. Geol. Surv. Prof. Paper 550-B, p. B115-B119, 1966.

Gertner, B., Crustal Seismic Refraction Profiles - A Compilation (Supplement No. 2), Federation of Astronomical and Geophysical Services of I.C.S.U., University of Toronto, 9 p., 1967.

Gertner, B., and R. M. Farquhar, Crustal Seismic Refraction Profiles, A Compilation (Supplement No. 3), Federation of Astronomical and Geophysical Services of I.C.S.U, University of Toronto, 20, 1968.

Gertner, B., and R. M. Farquhar, Crustal Seismic Refraction Profiles-A Compilation (Supplement No. 4), Federation of Astronomical and Geophysical Services of I.C.S.U., University of Toronto, 23, 1971.

Gertner, B., and R. M. Farquhar, Crustal Seismic Refraction Profiles-A Compilation (Supplement No. 5), Federation of Astronomical and Geophysical Services of I.C.S.U., University of Toronto, 20, 1972.

Gupta, R. A., and G. H. McTaggart-Cowan, Crustal Seismic Refraction Profiles - A Compilation (Supplement No. 1) University of Toronto 13, 1964.

I.A.V.C.E.I. Working Group, Data sheets of the Post Miocene Volcanoes of the World with Index Maps, 61, 1973.

International Association of Volcanology (Ed.), Catalogue of the Active Volcanoes of the World Including Solfatara Fields, part 1-21, 1951-1967.

McConnel, R. K., Jr., and G. H. McTaggart-Cowan, Crustal Seismic Refraction Profiles: A Compilation, University of Toronto, 171 p, 1963.

Monget, J.-M., and C.O. Bowin, A Gravity Data Library: Organization and Effective Utilization, Technical Rept. W.H.O.I. 74-33, 43p., 1974.

Thompson, B.N., Quaternary Volcanism of the Central Volcanic Region, New Zealand Jour. Geol. and Geophys., Vol. 7, No. 1, p. 45-66, 1964.

NAME: ABSTGC

TYPE: Main Program

PURPOSE: To abstract GCON data at a spacing of 10 nautical miles

MACHINE: XDS Sigma 7

PROGRAM CATEGORY: Statistical

DESCRIPTION:

The program processes one degree of GCON data at a time. The data is decoded and if the data falls within the degree square of concern the free air anomaly and height is added to the appropriate 10 nautical mile square value and the position is checked to see if this point is the closest to the center of the square. If it is the closest, the values and the position are retained. When all the data for the degree square is processed the GABS data record is written to the output device.

INPUT:

PARAMETER CARDS (via F:105)

1) Sense switch card
   SSW(46) = 0 no effect
   SSW(46) = 2 process within bounds and use D.L.T.

2) Geographic Bounds (in degrees)

Top	(KDTOP, I5)
Bottom	(KDBOT, I5)
Left	(KDLFT, I5)
Right	(KDRGT, I5)

3) D.L.T. deck if applicable

GCON DATA (via F:1)

Data in GCON format blocked 22 x 50.

OUTPUT:

GABS DATA (via F:2)

Data in GABS format. Data in each physical record is all the data for one degree square. The first logical record of each physical record is the whole-part of the latitude and longitude. Following are 36 logical records, one each for the 10 nautical mile squares (see figures 1 and 2)

ABSTGC (continued) page 2

USAGE:

SAMPLE RUN

```
!JOB
!LIMIT  (9T,2)(CORE,20),(TIME,XY)
!MESSAGE I/P tape info
!MESSAGE O/P tape info
!ASSIGN F:1(DEVICE,9T),(SN,XXXX),  (IN),(TRIES,10)
!ASSIGN F:2(DEVICE, 9T),(SN,YYYY),(OUT),(TRIES,10)
!LOAD (BI),(UNSAT,(312),(3))
            ABSTGC object deck

!RUN
!DATA

            Parameter cards
!EOD
```

RESTRICTIONS:

If bounds are to be checked a D.L.T. deck must be provided

STORAGE: 16K words

SUBPROGRAMS REQUIRED: ISW, FORTRANIV Library

TIMING: Thru-put time is about 3000 logical records/minute

PROGRAMMER: Lee Gove

ORIGINATOR: Carl Bowin

DATE: 15 October 1975

NAME: CHART

TYPE: Program

PURPOSE: Plot data on Mercator charts

SOURCE LANGUAGE: Sigma-7 Fortran 4

MACHINE: Sigma-7

PROGRAM CATEGORY: Graphical Display

DESCRIPTION:

Plots Mercator chart at specified scale, draws track and annotates with specified parameter.

INPUT:

Input formats: FIXSE, SEAG1, GSUM, MBATR, CALCM, and tabulations of refraction, earthquake, volcano, heat flow data. There is also a user specified format.

Program plots a 1/2-inch fiducial square in lower right corner of chart. If sides of square are offset means pen hit stops or lost registration in course of plotting.

1st card
(20A4) Label- up to 80 characters, plotted vertically on left-hand margin of chart.

2nd card Sense switch options

ISW(0) - ISW(79) (80I1) Put Sense switch (0) option in column 80, all others in column corresponding to switch number.

Optional card
If ISW(10) = 1 on card 2, put four-character name of input tape here, format (A4). Using this option (subroutine MOUNT) it is possible to generate a plot tape with several plots per job separated by EOF, from one or more input tapes. This card is never used when input data is in GSUM format. For MOUNT cards for GSUM format, see card)s) seven below.

3rd card (2(3I2,I4,5X), 3I5)

Column		
1,2	ISTDA	Start date for processing, for example
3,4	ISTMO	0204720341 means 2 February 1972 0341Z
5,6	ISTYR	If blank, plotting begins with first
7,10	ISTHM	record.

3rd card continued

Column		
16,17	IENDA	
18,19	IENMO	End date for processing - if blank, plotting will continue until EOD or EOF is encountered
20,21	IENYR	
22-25	IENHM	
31-35	ISKP	No. of records to be skipped at start of job, is much faster than using start date only.
36-40	ISFIL	No. of files to be skipped at start of job.
41-45	IBCKUP	For making a series of overlapping plots from the same file. Number of points common to this plot and the next. Tape is backed up IBCKUP+1 records before restarting program.

4th card (F10.0,2I5,1X,A4,4I5)

Column		
1-10	SINCH	= Inches/one degree of longitude in floating point
15	ITRK	= 0 for deleting track between plotting points 1 for including track
20	LCNT	= N, for plotting every N'th point only
25	NDEG	= for plotting every NDEG intermediate grid line for integer degree bounds and every NDEG minutes for non-integer degree bounds.
27-30	NUMPL	= plot number to be annotated in lower left-hand corner on plot (A4)
35	NPTA	= N, to annotate every N'th plotted point
39,40	JFMT	= Data format code = 1, FIXSE Format = 2, SEAG1 Format = 3, GSUM Format = 4, MBATR Format = 5, CALCM Format = 6, STATN Format = 7, SPFMT Format = 8, World seismicity Format = 9, Active Volcanoes = 10 Heat Flow = 11 Lunar Data = 12 User supplied
44,45	NX	= tells what value is to be annotated beside point - the value to be annotated is a function of NX and JFMT. For all formats NX = 0 omits annotation beside data point
50	NFILE	= No. of files on the input tape to be plotted on the same grid = 0 will still plot first file

```
JFMT  = 1, FIXSE Format - navigation
   NX = 1 for time, and date at change of date
      = 2 for month
      = 3 for year
      = 4 for day
      = 5 for zone

JFMT  = 2, SEAG1 Format - gravity
   NX = 1 for time, and date at change of day
      = 2 for water depth in corrected meters
      = 3 for free air anomaly
      = 4 for Bouguer anomaly
      = 5 for speed in knots
      = 6 for heading in degrees
      = 7 for Eotvos correction
      = 8 for Matthews Table number
      = 9 for low order 3 digits of total magnetic field intensity
      = 10 for total regional magnetic field (not implemented)
      = 11 for residual magnetic value (not implemented)
      = 12 for negative speed
      = 13 for negative water depth
      = 14 for negative Eotvos correction
      = 15 for negative Free Air anomaly
      = 16 for negative heading
      = 17 for total magnetic field intensity
      = 18 for uncorrected depth in meters
      = 19 for uncorrected depth in fathoms

JFMT  = 3, GSUM Format, - gravity summary
   NX = 1 for time
      = 2 for source code
      = 3 for elevation
      = 4 for depth
      = 5 for height
      = 6 for Free Air anomaly
      = 7 for Bouguer anomaly
      = 8 for terrain correction
      = 9 for complete Bouguer anomaly
      = 10 for regional Free Air anomaly
      = 11 for observed gravity

JFMT  = 4, MMATR Format - bathymetry
      = 1 for time
      = 2 for corrected depths in fathoms
      = 3 for corrected depths in meters
      = 4 for cumulative distance in kms
      = 5 for heading
      = 6 for speed in knots
      = 7 for uncorrected depths in fathoms
      = 8 for uncorrected depths in meters
```

4th card continued

JFMT = 5, CALCM Format - magnetic field

NX = 1 for time
= 2 for calculated regional field
= 3 for anomalous field
= 4 for cumulative distance in kms
= 5 for heading
= 6 for speed
= 7 for observed magnetic field

JFMT = 6, STATN Format - stations

Not implemented

JFMT = 7, SPFMT Format (Bowin format for Univ. of Toronto compilation of seismic refraction data)

NX = 1 for station number
= 2 for height
= 3 for mantle velocity
= 4 for depth to mantle
= 5 for crustal thickness
= 6 for average crustal velocity (CRVN) (Nafe-Drake)
= 7 for column weight (WETN) using Nafe and Drake velocity/density relation
= 8 for column weight (AVWTN) using average crustal density
= 9 for CRVW
= 10 for WGTW
= 11 for AVWTW

Same as 6 to 8 but using Woollard's velocity/density relation

JFMT = 8, World Seismicity Format

If SSW(16) = 1, then NX value is ignored and ANOV3 plots a spot whose type and size depends upon depth and magnitude of earthquake

If SSW(16) = 0

NX = 1 for date (month, day, year)
= 2 for depth in kilometers
= 3 for magnitude

JFMT = 9, Active Volcanoes

NX = 1 for region code number (from IVA Catalog of Active Volcanoes of the World)
= 2 for height in meters
= 3 for volume and page ((IPT*1000)+IPAGE)

4th card (Contd.)

JFMT = 10, Heat Flow

(For key to items 1, 6, and 7, see Simmons and Horai, Journ. Geophys. Res., Vol. 73, p. 6608-6629, 1968)

NX = 1 for catalog sequence number
= 2 for depth
= 3 for heat flow
= 4 for gradient
= 5 for conductivity
= 6 for classification code for station
= 7 for reference number
= 8 for year

JFMT = 11, Lunar Data

NX = No options implemented yet

JFMT = 12, User supplied format. Dummy Subroutine GETX is in library. User supplies his own as a binary or source deck with job. The following conventions must be followed:

If NX = 0 no annotations will take place.
If NX = 1 program will annotate with time.

5th card Format (4I5)

Column		
5	KPT	= 1 chart magnification factor (usually 1)
10	KHT	= Annotation character size in integer multiples of 0.07 inch (usually 1)
15	ICTYP	= 0 for non-integer degree chart boundaries = 1 for integer degree chart boundaries
19,20	IDEC	= variable for decimal point in annotation of plotted points = N, for N DIGITS to right of decimal point = 0 for decimal point only =-1 for suppressing decimal point

6th card Format (4I5) Values are negative for west and south

If ICTYP = 1 (integer degree boundaries)

Column		
1-5	ITOP	= Top boundary of chart
6-10	IBOT	= Bottom boundary of chart
11-15	ILEFT	= Left boundary of chart
16-20	IRIGT	= Right boundary of chart

If ICTYP = 0 (non-integer degree), then enter CHART boundaries on 4 cards in degrees and minutes Format (I5,F10.5) Be sure sign of the minutes agrees with the sign of degrees (e.g., -33-30.0) *

DATA:

Data in specified format are loaded in device having unit reference number 1.

OUTPUT:

Printer:
- Listing of inputs
- List of dates outside of chart boundaries ("OOB") if SSW(9) is up
- List of dates of all data read if SSW(12) is up

Plotter:
- Mercator Charts

USAGE: See operating instructions at the end of this section

RESTRICTIONS: None

STORAGE REQUIREMENTS: $18{,}432_{10}$locations

*7th card format (A4) for GSUM formatted data only.

Column 1-4 Input tape serial number, one per card, as many cards as input tapes. Last tape serial number card must have EITP in columns 1-4, to signal end of input tape serial numbers (calls subroutine MOUNT).

SUBROUTINES REQUIRED: Stored in library accounts 305, 312 and 3

GRID2,OLINE,WHR,ANOV2,RETBY,VETBY,GETC,GETF,GETG,GETM,GETS, GETST,GETH,GETP,GETV,GETY,GETL,GETX,MOUNT,STAT,ISW,TODAY, POSTAP,SPOT2,ANOV3,FIND,CALCOMP routines.

OPERATIONAL ENVIRONMENT:

Data input device - Unit reference number = 1
12" or 30" Calcomp Plotter

OPERATIONAL CHARACTERISTICS:

Sense Switch Options: Set to zero to decline option

SSW(0) = 1 to draw only the grid

SSW(1) = 1 to delete drawing NDEG lines (in GRID2)

SSW(2) = 1 if next plot will be on the same grid as this plot, sets pen back at origin

SSW(3) = 1 to only annotate date at change of day

SSW(4) = 0 for no mark at data point
= 1 for plotting a circle around data point
= 2 for plotting a dot at data point

SSW(5) = 0 to make degree annotations inside grid (character size 0.07")
= 1 to make degree annotations outside grid (character size 0.21")
= 2 to make degree annotations outside grid (character size 0.35")

SSW(6) For multiplot runs, = 1 will put on EOF between plots. Useful to PDP-5 operator for restarting in the event of mechanical malfunction of pen

SSW(7) = 0 to annotate on right side of track
= 1 to annotate on left side of track

SSW(8) = 1 to suppress plotting of grid

SSW(9) = 1 to list points out of bounds on line printer

SSW(10) = 1 to call subroutine MOUNT which reads serial number of input tape; not used for GSUM formatted data.

SSW(11) = 1 to annotate data points alternately on left and right side of track

SSW(12) = 1 to list date of data just read for identification

SSW(13) = 1 if two or more plots are to be made from the same file and this is not the last plot. Backs tape up to beginning of file and reinitializes program.

OPERATIONAL CHARACTERISTICS (Contd.)

SSW(16) = 1 to plot a spot for seismicity data whose type and size depends upon the depth and magnitude of the earthquake (ANOV4)

SSW(17) = 0 (seismicity) plots an x for pre-1961 data. Depth and magnitude data pre-1961 are limited. For these points, ANOV4 normally uses a symbol which does not vary in size

= 1 ANOV4 will try to plot varying sized symbols for all data, including pre-1961

= 9 will not plot pre-1961 data at all

This sense switch is used only if SSW(16)=1

SSW(18) = 0 to make annotation at right angles to incremental track (subroutine ANOV2)

= 1 to make annotations horizontally

= 2 to make annotations vertically

= 3 to invert annotations for headings 180 to 269

= 4 to annotate either horizontally or vertically depending on direction of track

SSW(19) = 0 for earth meridional parts from Bowditch

= 1 for meridional parts for spherical planet

SSW(20) = N, (seismicity) for additional size increment in plotting symbols for all data points (ANOV4). (Only if SSW(16)=1)

SSW(21) = N, (seismicity) for size factor by which plotting symbols will vary according to magnitude. If N = 0, then ANOV4 sets N = 2. (Only if SSW(16) = 1)

SSW(27) = 1 for GSUM data to suppress rewind input tape at start

SSW(30) = 1 to read GSUM from 2 cards

SSW(32) = 1 to read SPFMT from 2 cards

SSW(40) = 1 to process GSUM with BOUNDS using DLT

SSW(42) = 1 to read SEISMICITY data in blocked format

SSW(60) = 1 to process GSUM data only with IFFC = 4

SSW(61) = 1 to replace GSUM values with averaged values for FA, BG, ELEV, LAT, LONG

SSW(71) = 1 to annotate every two hours on the hour only

Program Flow:

Tape advances to start date. Program initialization choices are made, plotter draws and annotates Mercator grid, and then data in appropriate format are read and plotted one record at a time if within chart boundaries. If more than one plot is being made the program can be restarted using SSW(13), or by using SSW(6) and by putting a RUN and DATA card and continue with a new set of data cards.

TIMING:

Two to twenty minutes depending upon size of chart, number of intermediate degree lines plotted, and amount of data plotted and annotated.

ERROR MESSAGE DIAGNOSTIC:

Message	Cause	Action
OOB day, month, year, time	Date point is out of chart boundaries, and SSW(9) is up	Record is skipped, program continues
EOF day, month, year, time	End of file found on magnetic tape	Job ends or continues to next plot if any
PARITY ER day, month, year, time	Parity error found	Record is skipped, program continues
FMT ER day, month, year, time	Unidentified error found	Record is skipped, program continues

PROGRAMMER: Carl Bowin and Hartley Hoskins

ORIGINATOR: Carl Bowin

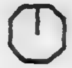
DATE: Version of 19 October 1972

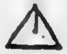
REFERENCES: Meridional parts calculated from formula given on page 1186 of Bowditch, "American Practical Navigator", 1962 corrected reprint, Govt. Printing Office, Washington, D. C. O. O. Publ. No. 9.

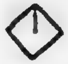
SEISMICITY CHARTS WITH VARYING SYMBOLS

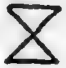
The type of symbol is determined by depth; size varies with magnitude.
(Subroutine ANOV4, version 15 Apr. 1975)

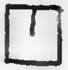
Depth

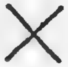
 - less than 70 km

 - 70 to 150 km

 - 150 to 300 km

 - 300 to 500 km

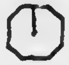
 - greater than 500 km

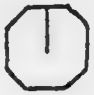
 - pre 1961 data

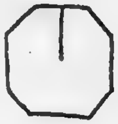
M_b MAGNITUDE

Sense switches 20 and 21 determine the size variables for each chart. In this example, both sense switches were left blank. The size increment is then automatically set equal to 2.

- less than 4.5

 - 4.5 to 5.5

 - 5.5 to 6.5

 - greater than 6.5

21 December 1976

NAME: CHARTG

TYPE: Program

PURPOSE: Plot GSUM, GCON, GABS on Mercator charts

SOURCE LANCUAGE: XEROX EXTENDED FORTRAN IV

MACHINE: Sigma-7

PROGRAM CATEGORY: Graphical Display

DESCRIPTION: Plots Mercator chart at specified scale, plots and annotates with specified parameter value.

INPUT:

Input formats: GSUM, GCON, GABS

Plotter registration: Program plots a 1/2 inch fiducial square in lower right corner of chart. If sides are offset, there has been a loss of registration.

Parameter Cards

Card 1 Label - up to 80 characters written vertically on left margin of chart (FORMAT(20A4))

Card 2 Sense Switch Options - (FORMAT(80I1)) put option in card column corresponding to sense switch (SSW(ø) in colum 80)

SSW(ø) = 1 to only draw grid (no input data read)
SSW(1) = 1 to delete all intermediate (NDEG) grid lines
SSW(2) = 1 next plot will be on the same grid
SSW(3) = 1 to annotate only at change of day
SSW(4) = 1 to plot a circle around data point
= 2 to plot a dot at the data point

INPUT (continued):

```
SSW(5)  = ø degree annotation inside grid
            (character size = 0.07")
        = 1 degree annotation outside grid
            (character size = 0.21")
        = 2 degree annotation outside grid
            (character size = 0.35")
SSW(6)  = 1 puts EOF between plots
SSW(7)  = ø annotate on left side of track
        = 1 annotate on right side of track
SSW(8)  = 1 to suppress plotting of grid
SSW(9)  = 1 list date and time of data out of bounds
SSW(10) = 1 to call mount to read serial
          number of input tape
SSW(11) = 1 to annotate data points alternately
          on left and right side of track
SSW(12) = 1 to list date of data just read
SSW(18) = ø annotations at right angles to track
        = 1 annotate horizontally
        = 2 annotate vertically
        = 3 invert annotations for headings
          between 180 to 269
        = 5 to do no annotation
SSW(19) = ø for earth meridional points from
          Bowditch
        = 1 for meridional points for spherical
          planet
SSW(25) = 1 to call MOUNT for input tape
          serial number
SSW(30) = 1 to read GSUM from punched-cards
SSW(40) = ø process unblocked GSUM (no DLT)
        = 1 process blocked GSUM (no DLT)
        = 2 process blocked GSUM (with DLT)
SSW(46) = ø process with bounds
        = 1 to make no check on bounds
SSW(71) = 1 to annotate every two hours on the
          hour
```

<u>Card 3</u> START/END Dates (Format(2(3I2,I4,1x),3I5))

Column		
1,2	Start Day	(ISTDA)
3,4	Start Month	(ISTMO)
5,6	Start Year	(ISTYR)
7,10	Start Time	(ISTHM)
16,17	End Day	(IENDA)
18,19	End Month	(IENMO)
20,21	End Year	(IENYR)
22,25	End Time	(IENHM)

INPUT (continued):

Card 4 (Format(F10.0,3I5,1X,A4,5I5))

Column		
1-10	Inches/one degree of longitude	(SINCH)
15	= 1 to draw track	(ITRK)
20	= N to plot every nth point	(LCNT)
25	= N to draw every nth grid line	(NDEG)
27-30	= number of plot	(NUMPL)
35	= N to annotate every nth plotted point	(NPTA)
39,40	= 3 to use GSUM = 13 to use GCON = 14 to use GABS	(JFMT)
44,45	= N to annotate with nth variable (see following table)	(NX)
50	= N to output N files on one grid	(NFILE)

Table for Selecting NX

NX	JFMT = 3 (GSUM)	13 (GCON)	14 (GABS)
0	omits annotation	omits annotation	omits annotation
1	time		
2	source code		
3	elevation		
4	depth	depth	average free air
5	height	height	average elevation
6	free air anomaly	free air anomaly	central free air
7	Bouguer anomaly	Bouguer anomaly	central elevation
8	terrain corrections	abstracted free air	number of points
9	complete Bouguer	abstracted height	
10	regional free air	average free air	
11	observed gravity	average height	

Card 5 (Format(4I5))

Column	
5	chart magnification factor (KPT)
10	annotation character size (KHT) in integer multiples of 0.07 inch
15	= 0 for non-integer chart boundaries (ICTYP) = 1 for integer chart boundaries
19,20	= N for N digits to right of decimal point = 0 for decimal point only = -1 for suppressing decimal point

INPUT (continued):

Card 6 (Format(4I5))

If ICTYP = 1 integer degree boundaries (Format(4I5))

Column	
1-5	Top boundary
6-10	Bottom boundary
11-15	Left boundary
16-20	Right boundary

If ICTYP = 0 non-integer boundaries (Format(I5,F10,5))

Enter one card each for top, bottom, left, right in degrees and minutes.

VALUES ARE NEGATIVE FOR WEST AND SOUTH

Remaining Cards

The remaining cards depend on if DLT's are used and if mount is called.

If neither are used, there are no more cards.

If only mount is called, then there is a card for each input tape of the form.

Column	
1-4	mag tape serial number (ITAPE)

And after all tape serial numbers there is a card with EITP from an ID. This signifies end of input tapes.

If D.L.T.'s are used, the D.L.T. deck is inserted immediately after the MOUNT serial number card for the appropriate tape.

OUTPUT:

Printer: Listing of input parameters

Plotter: Mercator charts

USAGE: See operating instructions

RESTRICTIONS: None

STORAGE REQUIREMENTS: 1349_{10} locations

SUBROUTINES REQUIRED:

Stored in library accounts 456, 305, 312, and 3

GRID2,OLINE,WHR,ANOV2,RETBY,VETBY,GETGS,MOUNT,STAT, ISW,TODAY,POSTAP,SPOT2,ANOV3,FIND,CALCOMP routines

OPERATIONAL ENVIRONMENT:

9-track tape drive, card reader, line printer, plotter

OPERATIONAL CHARACTERISTICS:

Program Flow:

Tape advances to start date. Program initialization choices are made, plotter draws and annotates Mercator grid, and then data in appropriate format are read and plotted one record at a time if within chart boundaries.

TIMING: About 1000 pts plotted per minute if the DLT is in use.

ERROR MESSAGE DIAGNOSTIC:

Message		Cause	Action
OOB	day, month, year, time	Data point is out of chart boundaries, and SSW(9) = 1	Record is skipped, program continues
EOF	day, month, year, time	End of file found on magnetic tape	Job ends or continues to next plot if any
PARITY ER	day,month, year,time	Unidentified error found	Record is skipped, program continues

PROGRAMMER: Carl Bowin, Hartley Hoskins, J.M. Monget

ORIGINATOR: Carl Bowin

DATE: May 1973

REFERENCES:

Meridional parts calculated from formula given on page 1186 of Bowditch, "American Practical Navigator", 1962 corrected reprint, Govt. Printing Office, Washington, D.C. O.O. Publ. No. 9.

NAME: CONV67

TYPE: Main Program

PURPOSE: Convert gravity data to 1967 Geodetic Reference System and the new basic value of gravity at Potsdam, 981260. mgals.

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Data Processing

DESCRIPTION:

CONV67 converts gravity data, in GSUM format and blocked by 50, from the 1930 gravity formula and Potsdam gravity value to the 1967 Geodetic Reference System and new Potsdam gravity values. The program makes use of the Asynchronous I/O available in XDS extended Fortran IV.

INPUT:

a) GSUM - blocked by 50 at 1930 datum (IREC=1)

OUTPUT:

a) GSUM - blocked by 50 at IGSN71 datum (IREC=2) and referenced to International Gravity Formula 1967.

USAGE:

```
!JOB
!MESSAGE (Mag tape info)
!ASSIGN F:1,(DEVICE,9T),(SN,XXXX),(IN),(TRIES,10)
!ASSIGN F:2,(DEVICE,9T),(SN,XXXX),(OUT),(TRIES,10)
!OLAY (BI),(UNSAT,(312),(305),(456),(3))
!RUN
```

RESTRICTIONS:

a) uses only tapes blocked by 50
b) must have GINTF (theoretical gravity function) for 1967 datum.

CONV67 continued

SUBPROGRAMS REQUIRED: GINTF

OPERATIONAL CHARACTERISTICS:

SENSE SWITCH OPTIONS - not applicable

PROGRAM FLOW

Using BUFF IN, BUFF OUT, ENCODE and DECODE,CONV67 performs asynchronous I/O while converting observed gravity, Free-Air anomaly and Bouguer anomaly.

ERRORS AND DIAGNOSTIC MESSAGES:

Waiting for Input - the processing has halted temporarily while a block of data is read into memory

Waiting for Output- the processing has halted temporarily while a block of data is written from memory

End of File on ITAPE - end of file mark encountered on input tape

End of File on JTAPE - end of reel foil encountered on output tape, no reel change will be made.

Buffer In Error - a read error has occurred but it is not fatal and processing will continue. Probably will result in some lost records.

Buffer Out Error- a write error has occurred but it is not fatal and processing will continue. Probably will result in some lost records.

PROGRAMMER: Lee Gove

ORIGINATOR: Carl Bowin

DATE: 1 December 1973

REFERENCES:

1) Geodetic Reference System 1967, Bureau Central De l'association Internationale de Geodesie, 1967.

NAME: CR2G

TYPE: Main Program

PURPOSE: Converts land gravity meter counter readings to observed gravity values

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran

PROGRAM CATEGORY: Data Processing

DESCRIPTION:

Takes input of a counter reading and converts the counter reading to gravity, also inserts drift and tidal corrections. The program lists the data for each station, punches cards for sorting, and writes a GSUM format file with anomalies calculated in reference to IGF 1930.

INPUT:

Card 1:

Conversion tables for the counter reading to relative milligal values (I2, F7.2) 70 cards

Card 2: Sense switches (80I1)

ISW(1) = 0 for printed output of computed values for each station
= 1 for suppression of printed output
ISW(2) = 0 to punch output for gravity description program (GDS)
= 1 for suppression of punched output
ISW(4) = 0 to output FILE TWO in GSUM format in preparation for sorting
= 1 to suppress output into FILE TWO
ISW(5) = 0 for meter drift correction
= 1 suppression of drift correction

Card 3: IGM(1),IGM(2),DRFTCO,LSRC,IELC,IGC (2A4,2X,F10.5,3I5)

IGM - gravity meter used (e.g. L&R G-18)
If these are both blank, the type of gravity meter will be set to the default value of 'L&R G-18'

DRFTCO - The correction factor for drift of the gravity meter
If this is blank, or set to 0.0, a drift variation of 0.003 mgal/day is assumed (default value)

LSRC - Source code of GSUM output. Default value is 006 - the source for the G-18 meter.

IELC - Elevation code for GSUM output. Default value is 09.

IGC - Gravity meter code for GSUM output. Default value is 01.

CR2G (continued) page two

INPUT (continued)

These are followed by groups of individual station counter reading cards. Each group is headed by three cards:

Card A: BASEG(1),BASEG(2) (F3.0,F6.2)
The absolute gravity value for the reference station

Card B: DENSE (F4.2)
The assumed crustal density to be used in calculation of the Bouguer anomaly

Card C: Counter reading card for the reference station. Drift is computed starting with the date on this card.

Card D: Counter reading cards for those stations which will be referenced to the station(card C)
Counter reading cards have the following format.
(format of 17 May 1966):
Station number (I4), Day (I2), Month (I2), Year (I2), Time (I4), Counter reading (F8.3), Latitude degrees (I2), Latitude minutes (F5.2), North or South (A1), Longitude degrees (I3), Longitude minutes (F5.2), West or East (A1), Elevation F7.1), Time Zone (I2), and Description (32A1).

Card E: Either a counter reading card with all zeros (or blanks) except for the year value (card columns 9 and 10) - signals the end of a group of stations. Program then tries to read a new absclute gravity value (card A above)

OR A card with all zeros (or blanks) - signals the end of input data.

OUTPUT:

A. Unless sense switch (1) equals 1, records of the following format will be output to the line printer, along with a page heading.

STAT = Station number
DATE = Day, month, year, e.g. 10 Dec. 1970 becomes 101270
TIME = Hour, minute
LAT = Latitude
LONG = Longitude
ELEV = Elevation
CR = Counter reading
RELV = Relative value of gravity to counter reading
DIFF = Difference of gravity between two readings
OBSG = Observed gravity
GFREE = Free-air gravity
BOUG = Bouguer gravity
CLS = Tidal correction
HONK = Honkasolo correction

CR2G (continued) page Three

OUTPUT (continued)

TZONE = Time zone corresponding to time
GDATE = Converted GMT date and time
DAYS = Days into the year
TDIFF = Time difference from origin
DRIFT = Drift correction that is being applied

B. Unless sense switch (4) equals 1, a file in GSUM format will be output to unit number 2 in preparation for sorting.

C. Unless sense switch (2) equals 1, cards will be punched for input to gravity description program.

NOTE: A card is not punched for the reference station

<u>RESTRICTIONS:</u> 1) CAUTION: If the drift of the meter is positive the value of DRFTCO must be negative.

Note also that if a value of 0.00 is entered for DRFTCO, a value of 0.003 will be assumed.

2) A maximum of 9000 cards can be input

<u>STORAGE REQUIREMENTS:</u> 1010 decimal words

<u>SUBPROGRAMS REQUIRED:</u> CDATE,CHGMT,GINTF,M2DY,TIDAL

<u>TIMING:</u> Unknown

<u>ERRORS AND DIAGNOSTICS:</u> None

<u>PROGRAMMER:</u> C. Bowin, J. Wolfe, S. Abbot

<u>ORIGINATOR:</u> C. Bowin

<u>DATE:</u> 1 August 1975

NAME: CR2G67

TYPE: Main Program

PURPOSE: Converts land gravity meter counter readings to observed gravity values

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran

PROGRAM CATEGORY: Data Processing

DESCRIPTION:

Takes input of a counter reading and converts the counter reading to gravity, also inserts drift and tidal corrections. The program lists the data for each station, punches cards for sorting, and writes a GSUM format file with anomalies calculated in reference to International Gravity Formula 1967.

INPUT:

Card 1:

Conversion tables for the counter reading to relative milligal values (I2, F7.2) 70 cards

Card 2: Sense switches (80I1)

ISW(1) = 0 for printed output of computed values for each station
= 1 for suppression of printed output

ISW(2) = 0 to punch output for gravity description program (GDS)
= 1 for suppression of punched output

ISW(4) = 0 to output FILE TWO in GSUM format in preparation for sorting
= 1 to suppress output into FILE TWO

ISW(5) = 0 for meter drift correction
= 1 suppression of drift correction

Card 3: IGM(1),IGM(2),DRFTCO,LSRC,IELC,IGC (2A4,2X,F10.5,3I5)

IGM - gravity meter used (e.g. L&R G-18)
If these are both blank, the type of gravity meter will be set to the default value of 'L&R G-18'

DRFTCO - The correction factor for drift of the gravity meter
If this is blank, or set to 0.0, a drift variation of 0.003 mgal/day is assumed (default value)

LSRC - Source code of GSUM output. Default value is 006 - the source for the G-18 meter.

IELC - Elevation code for GSUM output. Default value is 09.

IGC - Gravity meter code for GSUM output. Default value is 01.

CR2G67 (continued) page two

INPUT (continued)

These are followed by groups of individual station counter reading cards. Each group is headed by three cards:

Card A: BASEG(1),BASEG(2) (F3.0,F6.2)
The absolute gravity value for the reference station

Card B: DENSE (F4.2)
The assumed crustal density to be used in calculation of the Bouguer anomaly

Card C: Counter reading card for the reference station. Drift is computed starting with the date on this card.

Card D: Counter reading cards for those stations which will be referenced to the station(card C)
Counter reading cards have the following format.
(format of 17 May 1966):

Station number (I4), Day (I2), Month (I2), Year (I2), Time (I4), Counter reading (F8.3), Latitude degrees (I2), Latitude minutes (F5.2), North or South (A1), Longitude degrees (I3), Longitude minutes (F5.2), West or East (A1), Elevation F7.1), Time Zone (I2), and Description (32A1).

Card E: Either a counter reading card with all zeros (or blanks) except for the year value (card columns 9 and 10) - signals the end of a group of stations. Program then tries to read a new absolute gravity value (card A above)

OR A card with all zeros (or blanks) - signals the end of input data.

OUTPUT:

A. Unless sense switch (1) equals 1, records of the following format will be output to the line printer, along with a page heading.

STAT	= Station number
DATE	= Day, month, year, e.g. 10 Dec. 1970 becomes 101270
TIME	= Hour, minute
LAT	= Latitude
LONG	= Longitude
ELEV	= Elevation
CR	= Counter reading
RELV	= Relative value of gravity to counter reading
DIFF	= Difference of gravity between two readings
OBSG	= Observed gravity
GFREE	= Free-air gravity
BOUG	= Bouguer gravity
CLS	= Tidal correction
HONK	= Honkasolo correction

CR2G67 (continued) page three

OUTPUT (continued)

TZONE = Time zone corresponding to time
GDATE = Converted GMT date and time
DAYS = Days into the year
TDIFF = Time difference from origin
DRIFT = Drift correction that is being applied

B. Unless sense switch (4) equals 1, a file in GSUM format will be output to unit number 2 in preparation for sorting.

C. Unless sense switch (2) equals 1, cards will be punched for input to gravity description program.

NOTE: A card is not punched for the reference station

<u>RESTRICTIONS:</u> 1) CAUTION: If the drift of the meter is positive the value of DRFTCO must be negative.

Note also that if a value of 0.00 is entered for DRFTCO, a value of 0.003 will be assumed.

2) A maximum of 9000 cards can be input

STORAGE REQUIREMENTS: 1010 decimal words

SUBPROGRAMS REQUIRED: CDATE,CHGMT,GINTF,M2DY,TIDAL

TIMING: Unknown

ERRORS AND DIAGNOSTICS: None

PROGRAMMER: C. Bowin, J. Wolfe, S. Abbot

ORIGINATOR: C. Bowin

DATE: 1 August 1975

NAME: CRWT3

TYPE: Main Program

PURPOSE: To calculate the pressure at the base of a crustal column (Kg/cm^2).

MACHINE: Sigma 7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Mathematical (equation solving)

DESCRIPTION:

Reads U. of Toronto World Seismic Refraction Compilation at W.H.O.I. SPFMT format. Data may input on cards or mag tape.

Table look-up values for the conversion of compressional seismic velocity to density are entered during initialization. Compensation depth (e.g. 40 km) is also entered during initialization. Seismic refraction data of SPFMT format is read and the pressure at the compensation depth is then calculated. Crustal thickness, average crustal velocity and depth to mantle are also calculated and output in the SPFMT format.

INPUT:

Card 1: Sense switch options: Put sense switch 0 in column 80.

ISW(0) = 1 to list intermediate values for testing
ISW(26)=1 to output on line printer only
ISW(32) =1 to read SPFMT data from two cards per record
ISW(33) =1 to write SPFMT data on two cards per record

Card 2: ICTAB, DCOMP (I5,F10.0)
ICTAB = 0 for Nafe-Drake Density Table
= 1 for Woollard Density table
DCOMP = depth of compensation (Km).

Card 3: Density table cards (10F8.3) 10 values per card

Card(s) 4: (optional) SPFMT data cards, if data is on cards

Card 5: !EOD if data is on cards

CRWT3

OUTPUT: Data can be output either to mag tape or cards, depending on sense switches and control cards. If ISW(0) = 1, values read in and calculated are listed with annotation on the line printer.

USAGE:

Assign F:1 to input device; F:2 to output device

RESTRICTIONS:

STORAGE REQUIREMENTS: Unknown

SUBPROGRAMS REQUIRED: EVIL, EXIT, ISW, NAVIN, PINOT, STAT, TODAY

TIMING: Undetermined

ERRORS AND DIAGNOSTICS: If ISW(0) = 1, the program outputs annotated lists of values read and calculated.

PROGRAMMER: Carl Bowin

ORIGINATOR: Carl Bowin

DATE: 2 October 1974

NAFE-DRAKE EXPERIMENTAL RELATIONSHIP
(In Talwani, Sutton, and Worzel, 1959
JGR, v. 14, No. 10, p. 1548)
(Picks by C. Bowin)

V_p	ρ	V_p	ρ	V_p	ρ
1.0	0	4.0	2.39	7.0	3.04
1.1	0	4.1	2.41	7.1	3.07
1.2	0	4.2	2.425	7.2	3.10
1.3	0	4.3	2.44	7.3	3.13
1.4	0	4.4	2.45	7.4	3.16
1.5	1.47	4.5	2.48	7.5	3.19
1.6	1.66	4.6	2.50	7.6	3.22
1.7	1.73	4.7	2.52	7.7	3.25
1.8	1.80	4.8	2.53	7.8	3.28
1.9	1.86	4.9	2.55	7.9	3.31
2.0	1.92	5.0	2.57	8.0	3.34
2.1	1.98	5.1	2.59	8.1	3.38
2.2	2.01	5.2	2.61	8.2	3.42
2.3	2.03	5.3	2.62	8.3	3.46
2.4	2.06	5.4	2.64	8.4	3.49
2.5	2.09	5.5	2.66	8.5	3.525
2.6	2.11	5.6	2.68	8.6	3.56
2.7	2.13	5.7	2.70	8.7	3.59
2.8	2.15	5.8	2.72	8.8	3.63
2.9	2.18	5.9	2.74	8.9	3.67
3.0	2.21	6.0	2.77	9.0	3.71
3.1	2.23	6.1	2.80	9.1	3.74
3.2	2.24	6.2	2.83	9.2	3.78
3.3	2.26	6.3	2.85	9.3	3.82
3.4	2.28	6.4	2.87	9.4	3.85
3.5	2.30	6.5	2.90	9.5	3.88
3.6	2.32	6.6	2.93	9.6	3.91
3.7	2.34	6.7	2.95	9.7	3.95
3.8	2.36	6.8	2.975	9.8	3.99
3.9	2.375	6.9	3.01	9.9	4.02
				10.0	4.06

VEL-DENS RELATIONSHIP
(From Woollard (1959))

VEL. Km/sec.	ρ gm/cm^3	VEL. Km/sec	ρ gm/cc	VEL. Km/sec	ρ gm/cm^3
1.0	1.62	4.0	2.61	7.0	3.06
1.1	1.62	4.1	2.62	7.1	3.09
1.2	1.63	4.2	2.62	7.2	3.12
1.3	1.66	4.3	2.62	7.3	3.15
1.4	1.69	4.4	2.62	7.4	3.17
1.5	1.74	4.5	2.62	7.5	3.20
1.6	1.81	4.6	2.62	7.6	3.23
1.7	1.88	4.7	2.63	7.7	3.25
1.8	2.06	4.8	2.64	7.8	3.28
1.9	2.18	4.9	2.65	7.9	3.31
2.0	2.27	5.0	2.66	8.0	3.33
2.1	2.34	5.1	2.67	8.1	3.36
2.2	2.39	5.2	2.68	8.2	3.39
2.3	2.42	5.3	2.69	8.3	3.42
2.4	2.45	5.4	2.70	8.4	3.45
2.5	2.49	5.5	2.71	8.5	3.47
2.6	2.51	5.6	2.73	8.6	3.50
2.7	2.53	5.7	2.74	8.7	3.53
2.8	2.55	5.8	2.76	8.8	3.55
2.9	2.56	5.9	2.79	8.9	3.58
3.0	2.56	6.0	2.81	9.0	3.61
3.1	2.57	6.1	2.83		
3.2	2.58	6.2	2.85		
3.3	2.59	6.3	2.88		
3.4	2.59	6.4	2.90		
3.5	2.60	6.5	2.93		
3.6	2.60	6.6	2.96		
3.7	2.60	6.7	2.99		
3.8	2.61	6.8	3.01		
3.9	2.61	6.9	3.04		

NAME: DMABLK

TYPE: Main Program

PURPOSE: Converts blocked DMA format data to blocked GSUM format data

MACHINE: Sigma-7

SOURCE LANGUAGE Fortran IV

PROGRAM CATEGORY: Format conversion

DESCRIPTION:

DMABLK is a modification of DMA which, in turn, is a modification of program ACTG3.

DMABLK reads DMA data blocked by 50 and converts data with elevation codes 1 and 3 to GSUM formatted data blocked by 50. Source code and beginning sequence number are entered at run time; sequence number is output in station number field. Data records with elevation codes other than one and three are output to another tape in DMA format for further processing.

INPUT:

Card 1: NSEQ (I10) - starting sequence number

Card 2: ISORC (I5) - source code for this data

ERRORS AND DIAGNOSTICS:

'WAITING FOR I/P'	- input buffer not yet filled when checked
'END OF FILE ON ITAPE'	- end of file found on input tape
'NUFFER IN ERROR'	- input buffer error detected by ICHECK
'WAITING FOR OUTPUT'	- output buffer not yet filled when checked
'END OF FILE JTAPE'	- end of reel encountered on output tape
'BAD JKEY'	- end of reel encountered on output tape
'ALL DONE'	

OUTPUT:

On unit reference number 2: GSUM records for elevation codes 1
On unit reference number 3: DMA records for other elevation codes

The number of records input, records output to each output tape, and ending sequence number are output to line printer.

USAGE:

Assign F:1 to input device; F:2 to output device for GSUM records; F:3 to output device for 'oddball' records (elevation codes other than 1 and 3).

RESTRICTIONS: None

STORAGE REQUIREMENTS: Unknown

SUBPROGRAMS REQUIRED: ALTD, XEROX Fortran IV Library

TIMING: about 1,000 records per minute

PROGRAMMER: Lee Gove, C. Bowin

ORIGINATOR: C. Bowin

DATE: 31 July 1975

NAME: DMAP

TYPE: Main Program

PURPOSE: Converts digitized position in inches to latitude and longitude (radians)

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Format conversion

DESCRIPTION:

Digitized x and y coordinate values from a digitizing table for the four corners of a map region and read by the program along with latitude and longitude of each point. From this information the angle of tilt of the map and its scale are determined. Other x and y coordinate data points are then read in and the latitude and longitude of each is calculated to a precision governed by the input value for the variable EPSIL.

INPUT:

Card 1: sense switches

SSW(2) = 1 to list intermediate values
SSW(3) = 1 to list date and SMIN for each data point
SSW(5) = 1 to output SMIN only if greater than EPSIL

Card 2: ITAPE, JTAPE, EFAC, EPSIL (2I5,2F5.2)

ITAPE - unit number for input device
JTAPE - unit number for output device
EFAC - factor (0.1 to 1.00) used on iteration for estimated latitude to converge on true latitude
EPSIL - tolerance (in meridional parts) by which estimated latitude must match meridional parts for true latitude.

Card 3, 4, 5, and 6: ICODE, XC(J), YC(J),N1, N2,LAT(J) LONG(J) (I1,1X,F5.3,1X,F5.3,3I3,I5)

ICODE = 9 for cards 3, 4, 5 and 6 for initialization
J in do loop is = 1 for bottom left corner, then 2,3,4 counter clockwise around map corners
XC(J) = X coordinate value in inches
YC(J) = Y coordinate value in inches
N 1 = not used
N2 = not used
LAT(J) = Latitude
LONG(J) = Longitude

Card 7: ICODE, XP, YP, NDA, NMO, NYR, NHM
(I1, 1X, F5.3, 1X, F5.3, 3I3,I5)

ICODE = 5 for data points
XP = X coordinate value in inches
YP = Y coordinate value in inches
NDA = Day
NMO = Month
NYR = Year
= 0 on terminator card to indicate last data point has been processed.
NHM = Hours and minutes (24 hours clock)

OUTPUT:

Outputs record containing latitude and longitude for each input data point.

USAGE: Assign input and output devices compatible with ITAPE and JTAPE values entered on card 2.

RESTRICTIONS: None

STORAGE REQUIREMENTS: Undetermined

SUBPROGRAMS REQUIRED: CALSC, DMTOR, ISW, PARTM, RTODM

TIMING:

ERRORS AND DIAGNOSTICS: Undetermined

PROGRAMMER: Carl Bowin

ORIGINATOR: Carl Bowin

DATE: 26 September 1975

NAME: DMOD

TYPE: Main Program

PURPOSE: To punch digitized polygon points for crustal models digitized on a digitizing table

MACHINE: Sigma 7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Format Conversion

DESCRIPTION:

This program converts the coordinates for polygon points punched by a digitizing table to the correct format for use in a TALPLOT run and punches the cards necessary for all polygon points using origin and scale factors input to this program at run time. Input and output are always on cards. For instructions in the use of the digitizing table, see comments under USAGE.

The program initializes by reading sense switches, scale factors and coordinates origin. It sets the origin to the coordinates of first digitized point entered, uses the second digitized point to establish a horizontal reference line and then calculates X and Y distances of all points from the origin using the input scale factors. It punches cards with the adjusted and scaled X and Y coordinates along with the identification number of each polygon; one card for each polygon in which the point occurs.

INPUT:

Card 1: Sense Switch Options: (80I1)
ISW(1) = 0 for second point to right (+) of origin
= 1 for second point to left (-) of origin

Card 2: XFAC,YFAC,XORG,YORG (4 F10.0)
XFAC = scale factor in X direction (km/in)
YFAC = scale factor in Y-direction (km/in)
XORG = X-coordinate of origin of model (km)
YORG = Y-coordinator of origin of model (km)

The following cards are all punched at the digitizing table

Card 3: XA,YA,IA,KP1,KP2,KP3 (2F10.3,I5,3I4)
XA X and Y Coordinates from digitizing table from
YA its origin

IA
KP1 } =0 (same format as card(s) 5 below, but not used for this point)

Card(s) 5: Values from the digitizing table for the polygon points XP,YP,ICODE,KP1,KP2,KP3(2F10.3,I5,3I4)

XP X and Y coordinates of the polygon point
YP
ICODE = 9 for last point of a polygon
= 8 for X=-3000 km
= 7 for X=+3000 km
(ICODE=7 or 8 is used in this program only. Points with ICODE = 7 or 8 are punched by this program with ICODE = 0).
KP1 numbers of the polygons for which this point forms
KP2 a boundary. One output card will be punched for each
KP3 polygon listed here.

To indicate end of input cards, an additional polygon point card with ICODE set equal to 99 must follow the last digitized point.

OUTPUT: On line printer: the digitized points

On cards: Cards in the correct format for use in TALPLOT run. Values punched are X coordinate in km., Y coordinate in km., ICODE, and the number of the polygon for which the card was punched. Cards will usually not be in the correct order and there may be some extra cards (if the first polygon point is not the first polygon point for another polygon that it defines).

USAGE:

A crustal model is prepared which is composed of various polygons of various densities. The polygons are numbered arbitrarily, with the exception of polygon number 1, which is a water layer, and the final polygon, which must be number 99. One point of each polygon is designated the "starting point". Points define the polygons by proceeding clockwise from the starting point and ending exactly at the same point. Polygon points must be arranged in order for input to the TALPLOT program, but need not be digitized in order nor input in order to the program DMOD. Output from program DMOD must be rearranged for output to TALPLOT.

At the digitizing table, the first point digitized must be the origin. The second point is a point on the same X axis as the origin, and is used to establish the horizontal for the model. The remaining points may be digitized in any order. Before lining up a point, ICODE is set in the leftmost thumbwheel switch position on the manual entry switches. ICODE = 9 to indicate the last point of any given polygon. ICODE = 7 will punch a card at the same Y coordinate as the point under the digitizing screen, but with +3000 km as the X coordinate. ICODE = 8 creates a card with -3000 km as the X coordinate. These are used at the sides of the model to extend the edges of the polygons beyond the area for which gravity will be calculated in order to avoid an edge effect. In addition, the numbers of the polygons for which the given point delineates a boundary are set in the three pairs of thumbwheel switches to the right of the leftmost thumbwheel switch. In the DMOD program, a polygon point coordinate card is punched for each polygon number inserted here.

RESTRICTIONS:

1) When punching the first and last cards for each polygon on the digitizer, make sure that the cards read exactly the same values - otherwise the polygon will not close.

2) Right and down are positive on the model graph. That means that Y coordinates of polygon points below the sea surface are positive numbers.

3) Input and output must be on cards.

STORAGE REQUIREMENTS: Unknown

SUBPROGRAMS REQUIRED: CALSC,EXIT,ISW

TIMING: Undetermined

ERRORS AND DIAGNOSTICS: None

PROGRAMMER: Carl Bowin

ORIGINATOR: Carl Bowin

DATE: 24 July 1975

NAME: GFLD1

TYPE: Main Program

PURPOSE: Calculation of regional free-air anomaly values for a given region from spherical harmonic coefficients.

MACHINE: SIGMA 7

SOURCE LANGUAGE: FORTRAN IV

PROGRAM CATEGORY: Data Processing

DESCRIPTION:

Area bounds and increment size for region of interest are entered. GFLD1 next reads spherical harmonic coefficients defining a gravitational field. The program then steps across the region defined by the input area bounds calculating the regional gravity field at each position increment. Program outputs the regional free-air anomaly value in the free-air position of SEAG1 format.

INPUT:

Card 1: Sense switches (80I1)
ISW(4) = 1 to list data on high speed printer

Card 2: ITAPE, JTAPE (2I5)
ITAPE = input device number (used for input of spherical harmonic coefficients)
JTAPE = output device number

Card 3: ITOP, IBOT, ILEFT, IRIGT, INC (5I5)
ITOP = integer degree for top area boundary
IBOT = integer degree for bottom area boundary
ILEFT = integer degree for left area boundary
IRIGT = integer degree for right area boundary
INC = integer degree increment for do loop in defining positions at which regional free-air anomalies will be calculated.

Card 4: Spherical harmonic coefficients
Format (I2,2X,I2,2X,E11.4,2X,E11.4) followed by 2 !EOD card - this input can be on magnetic tape or disc by appropriate value of ITAPE, on card 2 above

OUTPUT:

On unit reference JTAPE. The data in SEAG1 format with regional free-air values in free-air field.

GFLD1

USAGE: Assign input and output devices to ITAPE and JTAPE values input on card 2.

RESTRICTIONS: None

STORAGE REQUIREMENTS: Unknown

SUBPROGRAMS REQUIRED: ISW, FLD2, standard Fortran IV Library

TIMING:

ERRORS AND DIAGNOSTICS:

PROGRAMMER:

ORIGINATOR:

DATE:

NAME: GFLD2

TYPE: Main Program

PURPOSE: Calculates regional free-air gravity anomalies from spherical harmonic coefficients entered at run time for location of input GSUM records.

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Data processing

DESCRIPTION:

GFLD2 reads spherical harmonic coefficients defining a gravitational field. A regional gravity value is computed from the input coefficients at latitude and longitude locations read from input GSUM records.

Program outputs regional free-air value in regional gravity position of GSUM format.

INPUT:

Card 1: Sense switches (80I2)

```
ISW(5) = 1 to list intermediate values for BV, COSD on
           line printer (SUB.FLD2)
ISW(12)= 1 to list date identification on line printer
           (SUB. GINOT)
ISW(26)= 1 to output on line printer only (SUB. GINOT)
ISW(29)= 1 to process only selected source codes
       = 2 to skip selected source codes (SUB.GINOT)
ISW(30)= 1 for input data on cards (SUB.GINOT)
ISW(31)=1 for output data on cards (SUB. GINOT)
ISW(40)= 0 to process without bounds
       = 1 to process with bounds using the Data
             Location Table (SUB.GINOT)
ISW(60)= 1 to process only Abstracter output (SUB. GINOT)
ISW(61)= 1 to replace FA, BG, ELEV, LAT, AND LONG
            with averaged values (SUB. GINOT)
```

Card(s) 2: Spherical harmonic coefficients format (I2,2X,I2, 2X,E11.4,2X,E11.4) followed by a !EOD card

Card 3: (optional) ISRC (16I5) See example for SAO Standard Earth 1969 If ISW(29) does not equal zero, enter here up to 16 source codes to be selected (ISW(29)=2) or skipped (ISW(29)=1).

If input is on magnetic tape:

GFLD2

Card(s) 4: Serial number(s) of input tapes, one per card, in columns 1 to 4 (used by subroutine MOUNT)

Card 5: EITP in columns 1 to 4 - signals end of input tape serial numbers

If input is on cards:

Card(s) 4: data cards in GSUM format-two cards per record

Card 5: !EOD card

If output is to magnetic tape:

Card(s) 6: Serial number(s) of output tapes, one per card in columns 1 to 4 (used by subroutine MOUNT).

Card 7: EOTP in col. 1 to 4 - signals end of output tape serial numbers.

There will be no cards 6 or 7 if output is on cards.

OUTPUT: On unit reference no. 2 - the data in GSUM format, with regional free-air values in regional free-air field.

USAGE: Assign F:1 to input device; F:2 to output device

RESTRICTIONS: None

STORAGE REQUIREMENTS: Unknown

SUBPROGRAMS REQUIRED: FLD2,GINOT,ISW, MOUNT, STAT, TODAY
Standard Fortran IV Library

TIMING: Undetermined

ERRORS AND DIAGNOSTICS: 'EOF FOUND ON INPUT TAPE'

PROGRAMMER: A. Folinsbee, Carl Bowin

ORIGINATOR: Carl Bowin

DATE: 5 August 1975

NAME: GRAFG2

TYPE: Main Program

PURPOSE: To plot one variable versus another

MACHINE: Sigma - 7

SOURCE LANGUAGE: FORTRAN IV

PROGRAM CATEGORY: Graphical Display

DESCRIPTION:

GRAFG2 creates a graph, plotting one variable against another. It uses input either in GSUM (gravity summary) format, or WHOLG (WHOI lunar gravity) format. It uses latitude and longitude for processing bounds. In addition, it can use either start and end dates or altitude bounds (in lunar format) as further limits to the data processed, if desired.

INPUT:

CARD 1: LABEL (20A4)
information for plot label

CARD 2: sense switch settings:
options

ISW(0) = 1 to output values for testing

ISW(3) = 1 to plot Lunar gravity (calls GETL)

ISW(4) = 1 to read SVEC altitude bounds for lunar data and process data only within these altitude bounds.

ISW(7) = 1 to input new area bounds for next plot

ISW(8) = 1 to suppress plotting grid

ISW(10) = 1 to start a new graph

ISW(12) = 1 to list date identification

ISW(13) = 1 to anotate plot point with DATAW

ISW(30) = 1 to read GSUM data from cards

ISW(34) = 1 to read Lunar data from cards

CARD 3: ITAPE, NX, NY, NZ, NW, IDEC, KPT, KHT (8I5)

ITAPE = input tape device number (must agree with control cards) Should = 105 to read from cards.
NX = PLT(NX) for X variable
NY = PLT(NY) for Y variable
NZ = PLT(NZ) for Z variable
NW = PLT(NW) for W variable
see page 3
IDEC = code for decimal point in annotation of DATAW
KPT = plot size factor-varies size of entire plot (should = 1 in standard plot)
KHT = character height factor (varies by multiples of 0.07)

CARD 4: XFAC, YFAC, ZFAC, WFAC, ANGB, XINC, YINC (7F10.0)

XFAC = engineering units per inch on X axis
YFAC = engineering units per inch on Y axis
ZFAC = engineering units per inch on Z axis
WFAC = engineering units per inch on W axis
ANGB = angle for DATAW anotation
XINC = spacing in decimal inches for anotation in x-direction
YINC = spacing in decimal inches for anotation in y-direction

CARD 5: TOP, BOT, DLEFT, RIGT (4F10.0)

TOP
BOT
DLEFT
RIGT
bounds for graph in engineering units

CARD(s) 6-9: area bounds in degrees and decimal minutes, one per card (I5,F10.0)

(6) IDEG, AMIN (TOP)
(7) " " (BOTTOM)
(8) " " (LEFT)
(9) " " (RIGHT)

Note: The sign of the minutes must agree with the sign of the degrees (e.g. -36 -30.0).

```
Values for NX,NY,NZ, and NW depend on input format.
    For GSUM format
        =  1 for KGHM     (time)
        =  2 for ISORC    (source code)
        =  3 for ELEV     (elevation)
        =  4 for DEPTH    (depth)
        =  5 for HEIGHT   (both depth and elevation in the
                           same parameter)
        =  6 for FA       (free-air anomaly)
        =  7 for BG       (Bouguer anomaly)
        =  8 for TC       (terrain correction)
        =  9 for BGCOM    (complete Bouguer anomaly)
        = 10 for RFA      (regional free air)
        = 11 for GOBS     (observed gravity)
        = 12 for HEIGHT/BG
    For lunar data (WOLG format)
        =  1 for SVEC     (vehicle distance from center of
                           mass in km)
        =  2 for SVEC-1738.0)  (vehicle distance from center of
                                 mass in km minus radius)
        =  3 for ALTL     (laser altitude)
        =  4 for ((SVEC-ALTL)-1738.0)
        =  5 for AZ       (azimuth)
        =  6 for SINC     (inclination)
        =  7 for STAC     (tangential acceleratior)
        =  8 for SNAC     (normal acceleration)
        =  9 for FA       (free-air anomaly-radial acceleration)
        = 10 for THEOR    (theoretical gravity)
        = 11 for GOBS     (observed gravity)
        = 12 for ELEV     (elevation of topography with reference
                           to radius)
        = 13 for ELFL     (laser altitude, with reference to
                           radius)
        = 14 for BG       (Bouguer anomaly)
        = 15 for TACEL    (total acceleration)
```

CARD 10: (optional) BSVEC,TSVEC (2F10.3)
spacecraft altitude bounds for lunar data
if ISW (4) =1.
BSVEC - lower altitude limit
TSVEC - upper altitude limit

CARD 11: ISTDA, ISTMO, ISTYR, ISTHM, IENDA, IENMO,
IENYR, IENHM, ISKP
(3I2, I4, 5X, 3I2, I4, 5X, I5)

Start date for processing
ISTDA - day
ISTMO - month
ISTYR - year
ISTHM - time

End date for processing
IENDA - day
IENMO - month
IENYR - year
IENHM - time

ISKP - number of records to be skipped at start of job. Much faster than start date alone.

To avoid checking for start date, use a blank card. Plotting will then begin with the first record.

CARD 12: ITAPID (I4)
Serial number of input tape(s), one per card.

CARD 13: EITP in columns 1-4
(signals end of input tape serial numbers)
There will be no cards 12 and 13 if input is on cards.

CARD(s) 14:
additional start and end dates for processing may be inserted here - last card must have start date = 99 to end processing.

OUTPUT:

Input parameters are listed on line printer. Graph can be output either to versatec or to calcomp plotter.

USAGE:

Any number of additional graphs may be run in the same job, by use of sense switches, and inserting additional data cards 6-11, to process data with new area bounds, or just a new start date (card 11).

RESTRICTIONS:

STORAGE REQUIREMENTS: 30 peak core pages (Core 15), on the limit card

SUBPROGRAMS REQUIRED: DMTOR, EXIT, FIND, GETG, GETL, GRIDG, ISW, NUMBER, PLOT, PLOTS, SETSKP, SKPREC, SPOT, STAT, SYMBOL, TODAY, WHERE

TIMING: Undetermined

ERRORS AND DIAGNOSTICS:

'END DATE PASSED" date

PROGRAMMER: Carl Bowin

ORIGINATOR: Carl Bowin

DATE: 2 June 1975

NAME: GRAV1

TYPE: PROGRAM

PURPOSE: Converts data input at format of 8 July 1969 to GSUM format.

MACHINE: SIGMA-7

SOURCE LANGUAGE: FORTRAN IV

PROGRAM CATEGORY: Format conversion

DESCRIPTION: GRAV1 converts data input at format of 8 July 1969 to 128 character GSUM format. Latitude and longitude are output in decimal degrees. Observed gravity can be calculated from FA anomaly, and is referenced to the IGSN-71 datum. The Bouguer anomaly is calculated, using reference density entered at run time. Anomalies may be input either in 1930 or 1967 International Gravity Formula, but all output is in 1967 IGF. If necessary, station numbers are assigned, numerically starting with first input record as 1. Resulting records can be listed on line printer, or intermediate values can be output, if desired. Data may be input and output either on cards or on magnetic tapes, depending upon control cards.

INPUT:

Card 1: Sense switch settings - Punch SSW(0) in column 80.

```
SSW(0)  = 1 for input elevation in feet
        = 0 for input elevation in meters
SSW(2)  = 1 for input depth in fathoms
        = 0 for input depth in meters
SSW(3)  = 1 to calculate observed gravity from FA
          anomaly
SSW(4)  = 1 for input data at Potsdam Reference
          System and 1930 International Gravity Formula
        = 0 for input data at IGSN-71 datum and 1967 IGF
```

SSW(6) = 1 for incorporating terrain correction
= 0 not to use terrain correction
SSW(8) = 1 to print values of THEO, FELEV, & TH67
SSW(13) = 1 to assign station numbers, numerically, starting with first input record as 1
SSW(26) = 1 to output on line printer only (GINOT)
SSW(31) = 1 to output data on two cards per record (GINOT)

Card 2: CRDEN (FIO.0)
CRDEN - assumed crustal density

Card 3: If output is to be on mag tape, output tape serial number (I4), in columns 1-4, one per card, as many cards as necessary

Card 4: EOTP in colums 1-4. Signals end of output tape serial numbers. Not necessary if output is on cards or line printer

Card(s) 5: Data cards if input is on cards

Card 6: !EOD

OUTPUT: Assumed crustal density, as input, is output to line printer. Records are output to line printer or output device depending on sense switch options. Records output to line printer begin with the second character of the record, and do not include IREC2. In addition, intermediate values for theoretical gravity may be output.

USAGE: Assign F:1 to input device; F:2 to output device.

RESTRICTIONS: None

STORAGE REQUIREMENTS: 21 peak core (pages)

SUBPROGRAMS REQUIRED: AREAK, STAT, GINOT, GINTF, GI67F, ISW, NAVIN, EVIL, RTDM2

TIMING: Unavailable

ERRORS AND DIAGNOSTICS: None

PROGRAMMER: Carl Bowin

ORIGINATOR: Carl Bowin

DATE: 27 May 1975

NAME: GSTOG

TYPE: Main Program

PURPOSE: Converts data input in SEAGl or SEAG2 format to 128 character GSUM format.

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Format conversion

DESCRIPTION:

GSTOG is our standard conversion program. It inputs data in SEAG format and outputs 128-character GSUM format. It tests for invalid observed gravity and invalid free-air anomaly values. If either data parameter is invalid, that record is rejected. Checks for no depth or elevation information and if lacking sets Bouguer anomaly value to invalid code (999.0).

If IREC = 1, input data is at Potsdam system and used IGF 1930 (SEAGl format).

If IREC = 2, input data is at IGSN71 and used IGF 1967 (SEAG2 format) and proper output will be provided at GSUM format.

INPUT:

Card 1: Sense Switch options -
SSW(26) = 1 to output on line printer only (GINOT)
SSW(31) = 1 to output data on two cards per record (GINOT)

Card 2: ISORC, IDCOD, IELC, IGC, BIAS (4I5,F10.0)
ISORC = source code number
IDCOD = 0 for ID by date
= 1 for ID by station number
IELC = elevation code
IGC = gravity meter code
BIAS = gravity meter bias (in mgals)

Card 3: NFILE (I5) NFILE = number of files to be input

Card 4: EITP in columns 1-4

GSTOG

Card 5: If output is to be on mag tape, output tape serial number (I4), in columns 1-4, one per card, as many cards as necessary.

Card 6: EOTP in columns 1-4. Signals end of output tape serial numbers. Not necessary if output is on cards or line printer.

OUTPUT:

Input parameters are output to line printer. Number of records output and number of records rejected are output to line printer.

Data records can be output on cards if desired by appropriate use of control cards and sense switches. Records may be output to line printer and if so, begin with the second character of the record and do not include IREC.

USAGE:

Assign F:1 to input device; F:2 to output device

RESTRICTIONS:

STORAGE REQUIREMENTS: 23 peak core pages (core,12)

SUBPROGRAMS REQUIRED: BICOR, EVIL, EXIT, GINOT, ISW, MCVOL, STAT, TODAY, UNPKBY

TIMING: CPU time = 12.9 min. to process 10,500 input records; 8,400 output records.

ERRORS AND DIAGNOSTICS:

PROGRAMMER:

ORIGINATOR: Carl Bowin

DATE: 10 July 1975

NAME: GSTOG67

TYPE: Main Program

PURPOSE: Converts data input in SEAG1 or SEAG2 format to 128 character GSUM format and converts Potsdam system data to IGSN71

MACHINE Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Format conversion

DESCRIPTION:

GSTOG is our standard conversion program. It inputs data in SEAG format and outputs 128-character GSUM format. It tests for invalid observed gravity and invalid free-air anomaly values. If either data parameter is invalid, that record is rejected. Checks for no depth or elevation information and if lacking sets Bouguer anomaly value to invalid code (999.0).

If IREC = 1, input data is at Potsdam system and used IGF 1930 (SEAG1 format). OUTPUT is at IGSN 1971.

If IREC = 2, input data is at IGSN71 and used IGF 1967 (SEAG2 format) and proper output will be provided at GSUM format.

INPUT:

Card 1: Sense Switch options -
SSW(26) = 1 to output on line printer only (GINOT)
SSW(31) = 1 to output data on two cards per record (GINOT)

Card 2: ISORC, IDCOD, IELC, IGC, BIAS (4I5,F10.0)
ISORC = source code number
IDCOD = 0 for ID by date
= 1 for ID by station number
IELC = elevation code
IGC = gravity meter code
BIAS = gravity meter bias (in mgals)

Card 3: NFILE (I5) NFILE = number of files to be input

Card 4: EITP in columns 1-4

Card 5: If output is to be on mag tape, output tape serial number (I4), in columns 1-4, one per card, as many cards as necessary.

Card 6: EOTP in columns 1-4. Signals end of output tape serial numbers. Not necessary if output is on cards or line printer.

OUTPUT:

Input parameters are output to line printer. Number of records output and number of records rejected are output to line printer.

Data records can be output on cards if desired by appropriate use of control cards and sense switches. Records may be output to line printer and if so, begin with the second character of the record and do not include IREC.

USAGE:

Assign F:1 to input device; F:2 to output device

RESTRICTIONS:

STORAGE REQUIREMENTS: 23 peak core pages (core,12)

SUBPROGRAMS REQUIRED: BICOR, EVIL, EXIT, GINOT, ISW, MCVOL, STAT, TODAY, UNPKBY

TIMING: CPU time = 12.9 min. to process 10,500 input records; 8,400 output records.

ERRORS AND DIAGNOSTICS:

PROGRAMMER:

ORIGINATOR: Carl Bowin

DATE: 10 July 1975

NAME: G3DCP

TYPE: Main Program

PURPOSE: Computes gravity anomaly (for both flat and curved planetary surfaces), potential field (for flat surfaces), and mass per unit area for a set of polygonal laminae comprising a three-dimensional crustal structure model.

MACHINE: XDS Sigma 7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Modeling

DESCRIPTION:

The program is based on a method developed by Talwani and Ewing (1960). The three-dimensional body is represented by depth contours. The depth contours are replaced by flat polygonal laminae. The gravity anomaly is evaluated for the laminae by a formula expressed in a closed form. A correction is then calculated for the curved surface and this correction is applied to the flat anomaly to arrive at a curved anomaly (see Bowin et al., in press). The anomaly for the entire body is then obstained by a numerical integration for the values of the individual laminae. The Z-axis is chosen positive down. The X and Y axes can lie along any two mutually perpenticular directions in the horizontal plane. The points where the anomaly is to be calculated are called field points. These are read from cards. The anomaly for each lamina is calculated in turn and a numerical integration is then performed to obtain the anomaly for the entire body. In addition the potential field and mass per unit area is also calculated.

INPUT:

Cards (via F:1)

Card 1: Sense switch card

Card 2: COORD Initialization card

Transverse Mercator Coordinate for X	(FX)
Transverse Mercator Coordinate for Y	(FY)
Latitude in Radians for point (X,Y)	(RLAT)
Longitude in Radians for point (X,Y)	(RLONG)
Starting switch	(IST)

G3DCP continued page 2

Input (continued)

Card 3:

Reference Weight (RFW;F8.1)
Reference Density(RFD;F4.2)
Reference Gravity (RFG;F5.1)

FILE: (via F:3)

The data representing the body as output by G3DCPREP.

OUTPUT:

PRINTER (via F108)

Printed output of various integration and corrections for each lamina.

USAGE:

In spite of indications to the contrary G3DCP, when used with LSORT and G3DCPREP is reasonably straight forward to use.

STEP 1 Definition of the bodies to be used

Each body for which an anomaly will be calculated must be defined lamina by lamina. A file is created for each body which has a group of records of the following form for each lamina.

Record 1

Lamina number	(NCNT;I2)
Density	(RHO;F10.4)
Vertical distance from origin	(Z;F16.6)

Following Records

X coordinate of polygon point	(X;F12.5)
Y coordinate of polygon point	(Y;F12.5)
Last point flag = 1 for last point in lamina	(LSLPT;I1)

STEP 2 Laminae Sorting

The bodies to be used are input to LSORT. This program will check that a user specified minimum lamina thickness is observed and counts the number of lamina per body.

G3DCP continued page 3

OUTPUT (continued)

STEP 3

Combination of bodies into one model

The bodies to be used in the particular model are combined into one file by program G3DCPREP in a format acceptable to G3DCP. At this point a reference density is specified for each body that will be subtracted from the density in the input file

STEP 4 Calculation of anomalies

The model and field points are input to G3DCP and the anomalies are calculated.

SAMPLE RUN

STEP 1 Definition of bodies

The bodies must be in the following format whether they are produced by hand or by some modeling program

Body 1 (file BOD1)

```
R.NO.   DATA
00001   [illegible]
00002   1     1.7700          3.000000
00003          .99998  2000.000000
00004          .99998 -2000.000000
00005         -.99998 -2000.000000
00006         -.99998  2000.000000
00007          .99998  2000.000001
00008   2     1.7700          3.440000
00009         8.79997  2000.000000
00010         8.79997 -2000.000000
00011        -8.79997 -2000.000000
00012        -8.79997  2000.000000
00013         8.79997  2000.000001
00014   3     1.7700          3.830000
00015        16.59996  2000.000000
00016        16.59996 -2000.000000
00017       -16.59996 -2000.000000
00018       -16.59996  2000.000000
00019        16.59996  2000.000001
00020   4     1.7700          4.220000
00021        24.39995  2000.000000
00022        24.39995 -2000.000000
00023       -24.39995 -2000.000000
00024       -24.39995  2000.000000
00025        24.39995  2000.000001
00026   5     1.7700          4.610000
00027        32.19994  2000.000000
00028        32.19994 -2000.000000
00029       -32.19994 -2000.000000
00030       -32.19994  2000.000000
00031        32.19994  2000.000001
00032   6     1.7700          5.000000
00033        39.99992  2000.000000
00034        39.99992 -2000.000000
00035       -39.99992 -2000.000000
00036       -39.99992  2000.000000
00037        39.99992  2000.000001
00038  10                                   1
00039   1     -.5000         10.000000
00040        39.99998  2000.000000
00041        39.99998 -2000.000000
00042       -39.99998 -2000.000000
00043       -39.99998  2000.000000
00044        39.99998  2000.000001
00045   2     -.5000         10.700000
00046        36.02823  2000.000000
00047        36.02823 -2000.000000
00048       -36.02823 -2000.000000
00049       -36.02823  2000.000000
00050        36.02823  2000.000001
00051   3     -.5000         11.410000
00052        32.05649  2000.000000
00053        32.05649 -2000.000000
00054       -32.05649 -2000.000000
00055       -32.05649  2000.000000
00056        32.05649  2000.000001
00057   4     -.5000         12.110000
00058        28.08473  2000.000000
00059        28.08473 -2000.000000
```

```
R.NO.   DATA
00060       -28.08473 -2000.000000
00061       -28.08473  2000.000000
00062        28.08473  2000.000001
00063   5     -.5000         12.810000
00064        24.11298  2000.000000
00065        24.11298 -2000.000000
00066       -24.11298 -2000.000000
00067       -24.11298  2000.000000
00068        24.11298  2000.000001
00069   6     -.5000         13.520000
00070        20.14124  2000.000000
00071        20.14124 -2000.000000
00072       -20.14124 -2000.000000
00073       -20.14124  2000.000000
00074        20.14124  2000.000001
00075   7     -.5000         14.220000
00076        16.16948  2000.000000
00077        16.16948 -2000.000000
00078       -16.16948 -2000.000000
00079       -16.16948  2000.000000
00080        16.16948  2000.000001
00081   8     -.5000         14.920000
00082        12.19774  2000.000000
00083        12.19774 -2000.000000
00084       -12.19774 -2000.000000
00085       -12.19774  2000.000000
00086        12.19774  2000.000001
00087   9     -.5000         15.620000
00088         8.22598  2000.000000
00089         8.22598 -2000.000000
00090        -8.22598 -2000.000000
00091        -8.22598  2000.000000
00092         8.22594  2000.000001
00093  10     -.5000         16.330002
00094         4.25426  2000.000000
00095         4.25426 -2000.000000
00096        -4.25426 -2000.000000
00097        -4.25426  2000.000000
00098         4.25426  2000.000001
```

BODYZ (FILE BOD2)

```
 1     2.8000                 10.00    .00
     39.99998  2000.00000
     39.99998 -2000.00000
    -39.99998 -2000.00000
    -39.99998  2000.00000
     39.99998  2000.000001
 2     2.8000                 10.70    .00
     36.02823  2000.00000
     36.02823 -2000.00000
    -36.02823 -2000.00000
    -36.02823  2000.00000
     36.02823  2000.000001
 3     2.8000                 11.41    .00
     32.05649  2000.00000
     32.05649 -2000.00000
    -32.05649 -2000.00000
    -32.05649  2000.00000
     32.05649  2000.000001
 4     2.8000                 12.11    .00
     28.08473  2000.00000
     28.08473 -2000.00000
    -28.08473 -2000.00000
    -28.08473  2000.00000
     28.08473  2000.000001
 5     2.8000                 12.81    .00
     24.11298  2000.00000
     24.11298 -2000.00000
    -24.11298 -2000.00000
    -24.11298  2000.00000
     24.11298  2000.000001
 6     2.8000                 13.52    .00
     20.14124  2000.00000
     20.14124 -2000.00000
    -20.14124 -2000.00000
    -20.14124  2000.00000
     20.14124  2000.000001
 7     2.8000                 14.22    .00
     16.16948  2000.00000
     16.16948 -2000.00000
    -16.16948 -2000.00000
    -16.16948  2000.00000
     16.16948  2000.000001
 8     2.8000                 14.92    .00
     12.19774  2000.00000
     12.19774 -2000.00000
    -12.19774 -2000.00000
    -12.19774  2000.00000
     12.19774  2000.000001
 9     2.8000                 15.62    .00
      8.22598  2000.00000
      8.22598 -2000.00000
     -8.22598 -2000.00000
     -8.22598  2000.00000
      8.22598  2000.000001
10     2.8000                 16.33    .00
      4.25426  2000.00000
      4.25426 -2000.00000
     -4.25426 -2000.00000
     -4.25426  2000.00000
```

```
      4.25426  2000.000001
```

STEP 2 Laminae Sorting (see LSORT documentation)

```
!ASSIGN F:1,(FILE,BOD1),(IN)
!ASSIGN F:2,(FILE,BOD2),(IN)
!ASSIGN F:7,(FILE,SORT1),(OUT),(SAVE)
!ASSIGN F:8,(FILE,SORT2),(OUT),(SAVE)
!ASSIGN F:13(FILE,SORTCNT),(OUT),(SAVE)
!LOAD(BI),(UNSAT,(305),(312),(3))
   LSORT Binary Deck
!RUN
!DATA
  0.1
  02
!EOD
```

STEP 3 Combination of Bodies (see G3DCPREP documentation)

```
!ASSIGN F:1,(FILE,SORT1),(IN),(SAVE)
!ASSIGN F:2,(FILE,SORT2),(IN),(SAVE)
!ASSIGN F:13,(FILE,SORTCNT),(IN),(SAVE)
!ASSIGN F:7,(FILE,G3DCIN),(OUT),(SAVE)
!LOAD (BI),(UNSAT,(3))
    G3DCPREP Binary Deck
!RUN
!DATA
  02
  1.03
  3.3
!EOD

        FILE G3DCIN
```

STEP 4 Calculation of Anomalies

```
!ASSIGN F:1,(DEVICE,SI)
!ASSIGN F:3,(FILE,G3DCIN),(IN),(SAVE)
!LOAD (BI),(UNSAT,(514),(456),(305),(312),(3))
!RUN
!DATA
    Sense switch card
    Coord initialization card
    Reference card
    Field point card (s)
                               Last field point card has 1 in col.43
!EOD
```

STORAGE REQUIREMENTS: 30,000 decimal words

SUBPROGRAMS REQUIRED: COORD, STAT, GINOT, PLANET, FORTRAN IV library

PROGRAMMER: Bruce Simon

ORIGINATOR: Carl Bowin

DATE: 1 October 1975

REFERENCES: Bowin, Simon and Wollenhaupt, Mascons a Two Body Solution, Journal of Geophysical Research, in press

Talwani, M., and M. Ewing, Rapid Computation of Gravitational Attraction of Three-Dimensional Bodies of Arbitrary Size, Geophysics, XXV, 203-225, 1960.

NAME: G3DCPREP

TYPE: Main Program

PURPOSE: To prepare input to program G3DCP

MACHINE: Sigma 7

SOURCE LANGUAGE: Extended Fortran IV

PROGRAM CATEGORY: File management

DESCRIPTION:

G3DCPREP prepares the input to the modeling program G3DC from LSORT output.

INPUT:

Cards

Card 1: Number of bodies to be input (NUMBOD;I2)
Cards 2-6: A reference density for each body to be subtracted from the density in the LSORT output (REFD;F10.0)

Files

Files 1-6: 1 file for each of up to 6 bodies to be input to G3DC
File 13: file with laminae count for each body input

OUTPUT:

Files

File 7: a file compatible with G3DC to be used as input to G3DC

USAGE: See G3DCP documentation

SUBROUTINES REQUIRED: Fortran IV Library

PROGRAMMER: Lee Gove

ORIGINATOR: Lee Gove

DATE: 1 October 1975

```
 1     2.8000                   3.05    .00
        .99998   2000.00000
        .99998  -2000.00000
       -.99998  -2000.00000
       -.99998   2000.00000
        .99998   2000.000001
 2     2.8000                   3.24    .00
       4.89998   2000.00000
       4.89998  -2000.00000
      -4.89998  -2000.00000
      -4.89998   2000.00000
       4.89998   2000.000001
 3     2.8000                   3.44    .00
       8.79997   2000.00000
       8.79997  -2000.00000
      -8.79997  -2000.00000
      -8.79997   2000.00000
       8.79997   2000.000001
 4     2.8000                   3.63    .00
      12.69997   2000.00000
      12.69997  -2000.00000
     -12.69997  -2000.00000
     -12.69997   2000.00000
      12.69997   2000.000001
 5     2.8000                   3.83    .00
      16.59996   2000.00000
      16.59996  -2000.00000
     -16.59996  -2000.00000
     -16.59996   2000.00000
      16.59996   2000.000001
 6     2.8000                   4.02    .00
      20.49995   2000.00000
      20.49995  -2000.00000
     -20.49995  -2000.00000
     -20.49995   2000.00000
      20.49995   2000.000001
 7     2.8000                   4.22    .00
      24.39995   2000.00000
      24.39995  -2000.00000
     -24.39995  -2000.00000
     -24.39995   2000.00000
      24.39995   2000.000001
 8     2.8000                   4.41    .00
      28.29994   2000.00000
      28.29994  -2000.00000
     -28.29994  -2000.00000
     -28.29994   2000.00000
      28.29994   2000.000001
 9     2.8000                   4.61    .00
      32.19994   2000.00000
      32.19994  -2000.00000
     -32.19994  -2000.00000
     -32.19994   2000.00000
      32.19994   2000.000001
10     2.8000                   4.80    .00
      36.09993   2000.00000
      36.09993  -2000.00000
     -36.09993  -2000.00000
     -36.09993   2000.00000



      36.09993   2000.000001
11     2.8000                   5.00    .00
      39.99992   2000.00000
      39.99992  -2000.00000
     -39.99992  -2000.00000
     -39.99992   2000.00000
      39.99992   2000.000001
```

NAME: HIG

TYPE: Main Program

PURPOSE: To convert gravity data in the format used by the Hawaii Institute of Geophysics (HIG) to GSUM format.

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Format conversion

DESCRIPTION:

HIG simply reads a record in H.I.G. format and converts the record to a GSUM record with format forward code of 17

INPUT:

Unblocked tape in HIG format on device no. 1

CARDS:

1) Sense switch options - all zero (or blank)
2) Source code (I5)
3) Input tape serial number (4A1)
4) EITP in columns 1 to 4
5) Output tape serial number (4A1)
6) EOTP in columns 1 to 4

OUTPUT:

Unblocked tape in GSUM format on device no. 2

USAGE:

```
!JOB
!LIMIT
!MESSAGE (I/O mag tape info)
!ASSIGN F:1,(DEVICE, 9T),(SN,xxxx), (IN),(TRIES,10)
!ASSIGN F:2,(DEVICE,9T),(SN,xxxx), (OUT),(TRIES, 10)
!OLAY
!RUN
!DATA
          Data Cards
!EOD
```

HIG continued, page 2

RESTRICTIONS:

SUBROUTINES REQUIRED: GINOT STAT FORTRAV IV library

OPERATIONAL CHARACTERISTICS: Simple read-then-write program

PROGRAMMER: Lee Gove

ORIGINATOR: Carl Bowin

DATE: 1 December 1973

NAME: LSORT

TYPE: Main Program

PURPOSE: To edit and sort polygonal laminae of G3DC format

MACHINE: Sigma-7

SOURCE LANGUAGE: Extended Fortran IV

PROGRAM CATEGORY: File Management

DESCRIPTION:

LSORT reads, for each of up to 6 bodies, up to twenty laminae. It counts them, discards laminae of thickness less than ZLIM, and prepares files for input to G3DCPREP

INPUT:

Cards

Card 1: Minimum allowable thickness for a single laminae (ZLIM;F10.0)

Card 2: Number of bodies (files) to be input (NUMBOD;I2)

Files

Files 1-6: 1 file for each of up to 6 bodies

File 13: file of counts of laminae for each body

USAGE: See G3DCP documentation

SUBRCUTINES REQUIRED: FORTRAN IV Library

PROGRAMMER: Lee Gove

ORIGINATOR: Lee Gove

DATE: 1 October 1975

NAME: MODPLOT

TYPE: Main Program

PURPOSE: Plots data for preparation of crustal structure models of the earth's crust and plots the output tapes from TALPLOT16

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Graphical display

DESCRIPTION:

This program performs two basic functions. It will plot a profile of data used in the preparation of two-dimensional structure models of the earth's crust as well as plotting the structural models themselves.

Input to this program may include output from a TALPLOT16 run and/or combinations of data output from PROJ4 and/or SAINT2 runs and model polygons. TALPLOT16 is a program that computes the gravitational attraction of two-dimensional structure models. The PROJ4 program projects data from any given area to a selected straight line and outputs a card deck which is then used to plot profiles of the data. The SAINT2 program will interpolate the data output from PROJ4 at regularly spaced intervals (in order to reduce the effects of small local variations) and output data that can also be plotted as profiles.

At the present time, the types of data that the PROJ4 program will process are: GSUM format (containing free-air and Bouguer gravity data, bathymetry and elevation), SPFMT format (containing seismic refraction data), seismicity data, and the model polygon portion of Talplot16 input data.

Program operation is determined by sense switch options selected via the first data card and the order in which the various types of data are arranged in the input deck. The JFMT number (input card 7) informs the program what kind of data follows in the input deck. The data terminator cards (input card 9) indicate completion of input of present JFMT type data. Another JFMT card is then read in. If it equals 9, then the job is terminated.

INPUT:

Card 1: Values of SSW(I). Format (80I1) See SSW options under USAGE)

Card 2: XFACT,YFACT,TOP,BOT,BLEFT,RIGT (6F10.0)

XFACT - The number of km's/inch in the x-direction (long axis of plot).

YFACT - The number of km's/inch in the y-direction.

TOP - The upper bound for the model (km). Elevation above sea level is negative,depth below sea level is positive. To avoid boundary effects, the value of TOP should be more negative than the y-coordinate of the point of highest elevation to be plotted.

BOT - The lower bound for the model (km). The value of BOT should be a greater positive number than the base of the model, to avoid truncating the bottom of the model.

BLEFT - The left boundary (km) of the data and model to be plotted.

RIGT - The right boundary (km) of the data and model to be plotted.

Card 3: ELFAC,ELDIS,GFAC,GDIS,WFAC,WDIS,PFAC,PDIS(8F10.0)

ELFAC - The scale factor for elevation (km/in).

ELDIS - The distance of the origin of the elevation profile above the origin of the model (inches).

GFAC - The scale factor for gravity; free-air and Bouguer (mgal/in).

GDIS - The distance of the origin of the plot of free-air and/or Bouguer gravity data above the origin of the structure model (inches).

WFAC - The scale factor for the model weight profile (kg/in).

WDIS - The distance of the origin of the weight profile below the base of the model.

PFAC - The scale factor for individual polygon contributions (mg/in).

PDIS - Distance of the origin of the curves (contribution of individual polygons) above the origin of the structure model.

Card 4: HT, DBOT (2F10.0)

HT - Character height multiplication factor in multiples of 0.07" (used in the call to symbol for the plotting of the anomaly curves). If HT = 0 a default value of 3 is assumed. (0.21").

DBOT - The distance that the weight curve is supposed to be plotted above the bottom of the plot.

Omit the following cards when plotting only the output from TALPLOT16.

Card 5: A label card containing 80 columns of alphanumeric data. This will appear at the beginning of the plot. Include this label card only if SSW(1) = 1. If SSW(1) = 0 or 2, then the label is obtained from the TALPLOT16 output tape.

Card 6: Crustal structure section (CSS) identification card (same card as used in the PROJ4 run). CSS ID, ANG, DMAXM, ILAT, RILTM, ILONG, RILDM, LABEL (8A1,2X,2F10.0,I4,F6.2,I4,F6.2,30A1)

CSS ID - Crustal structure section identification number (CSS-NNN).

ANG - The angle between the vertical and the straight line to which the data has been projected in the PROJ4 program.

DMAXM - The greatest distance (km) from the reference point for which data will be accepted.

ILAT - The latitude, in degrees, of the reference point for the line.

RILTM - The latitude, in decimal degrees, of the reference point.

ILONG - The longitude, in degrees, of the reference point.

RILDM - The longitude, in decimal degrees, of the reference point.

LABEL - A label containing up to 30 alpha-numeric characters

Card 7: JFMT (J-format) (I1)

JFMT	For	JFMT Data Terminator (I1)
1 (or 2)	GSUM	2 - "8" cards (column 1)
3	SPFMT	2 - "8" cards
4	SEISMICITY	1 - "8" card
5	MODEL POLYGONS	none
6	TALPLOT16 INPUT	none

Note: 5 and 6 both read TALPLOT16 input. JFMT=6 reads from card 1 of TALPLOT16. JFMT=5 reads from after card 5 of TALPLOT16. In either case, only the model polygons will be plotted.

A. If input is on cards:

Card 8: data cards for the JFMT
Card 9: data terminator cards (see card 7)

B. If input created by the PROJ4 program is on mag tape, and JFMT = 1 or 2 for GSUM format:

Card 8: input tape serial number (I4)
Card 9: EITP in columns 1-4.

C. If input created by the PROJ4 program is on tape, but is some format other than GSUM, there will be no cards 8 or 9. Data termination cards are already on the mag tape.

Repeat cards 7 - 9 for each JFMT data type to be plotted.

Card 10: JFMT = 9 to terminate the job (I1)

OUTPUT

1) on line printer: the input parameters
2) on Calcomp plotter: profiles of the data and/or two-dimensional plot model input to the program.

USAGE:

Sense Switch Settings

```
SSW(1) = 0 to plot only from TALPLOT16 output tape
       = 1 to plot PROJ4 data, and/or model polygons: reads JFMT.
       = 2 to plot both TALPLOT16 output tape and PROJ4 data
SSW(2) = 1 to plot Bouguer anomaly in addition to the free-air
SSW(3) = 1 to plot height from GSUM data
SSW(4) = 1 to plot elevation. The input values are on the
           TALPLOT16 output tape (in meters).  Use only if
           elevation data was input to previous TALPLOT16 run.
```

SSW(5) = 1 to plot observed and calculated gravity.
SSW(6) = 1 to plot weight
SSW(7) = 1 to plot contribution of each polygon.
SSW(8) = 1 to plot two-dimensional Bouguer anomaly in TALPLOT16 output.
SSW(13)= 1 to print intermediate values.
SSW(14)= 1 to plot only a dot for GSUM free-air values, rather than a continuous line.

Be sure that SSW(14) = 1 if plotting from unsorted PROJ4 output.

SSW(30)= 1 to read GSUM data on 2 cards
SSW(32)= 1 to read SPFMT data on 2 cards
SSW(36)= 1 to read Seismicity data from cards
SSW(44)= 1 to read Seismicity data in blocked format

The calculated anomaly plot is marked by asterisks.

RESTRICTIONS:

Elevation above sea level is negative, depth below sea level is positive.

STORAGE REQUIREMENTS: Unknown

SUBPROGRAMS REQUIRED: ANOV3, DISAZ, DMTOR, DNAV, EVIL, EXIT, EXTD, GINOT, INCEP, ISW, PINOT, PLOT, PLOTS, SPLOT, SPOT, STAT, SYMBOL, WHERE, YINOT, STANDARD FORTRAN IV LIBRARY.

TIMING: TALPLOT16 output of approximately 200 polygon points will take just under two minutes of computer time. For other data types, the timing is undetermined.

ERRORS AND DIAGNOSTICS:

Message	Error
"Plot too wide, width = VIT"	Distance of model origin above the bottom (right) of paper is too great. The value of VIT must be less than 29. (VIT = DBOT + WDIS + YWIDE/YFACT) where (YWIDE = TOP-BOT)

PROGRAMMER: Carl O. Bowin

ORIGINATOR: Carl O. Bowin

DATE: 12 June 1974

NAME: NOAA

TYPE: Main Program

PURPOSE: To convert gravity data in NOAA format to WHOI GSUM format

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Format Conversion

DESCRIPTION:

NOAA uses asychronous I/O to speed up the conversion of NOAA data to GSUM. The GSUM record has a format forward code of 16. The input tape is blocked by 20 and the output is blocked by 50. Input gravity data is assumed to be referenced to International Gravity Formula 1930.Conversion to IGF 1967 is made in another program.

INPUT:

1) Mag-tape in NOAA format blocked by 20
2) Cards
    1) Source Code(I5)

OUTPUT:

1) Mag tape in WHOI GSUM format blocked by 50

USAGE:

```
!JOB
!MESSAGE (Mag tape info)
!ASSIGN F:1,(DEVICE,9T),(SN,xxxx),(IN),(TRIES,10)
!ASSIGN F:2,(DEVICE,9T),(SN,xxxx),(OUT),(TRIES,10)
!OLAY
!RUN
!DATA
      Data card
!EOD
```

RESTRICTIONS:

a) NOAA tape must be blocked by 20
b) GSUM tape blocked by 50 with format forward code = 16

NAME: PROFG

TYPE: Main Program

PURPOSE: Profiles GSUM data

MACHINE: XDS Sigma 7

SOURCE LANGUAGE Fortran IV

PROGRAM CATEGORY Graphical Display

DESCRIPTION:

This program profiles various parameters in GSUM format. By using GINOT as the input routine all the options in GINOT are available.

INPUT:

```
1) GSUM data (via F:1)
                 GSUM data on tape or cards, blocked or unblocked
2) Cards:

                 Card 1   Sense switch card
                    SSW(5) = 0 no effect
                           = 1 to select station
                    SSW(14)= 0 no effect
                           = 1 process only if data after start date
                    SSW(25)= 0 no effect
                           = 1 to call MOUNT
                    SSW(29)= 0 no effect
                           = 1 process only specified source codes
                           = 2 skip specified source codes
                           = 3 process only specified format-forward codes
                           = 4 skip specified  format-forward codes
                    SSW(30)= 0 no effect
                           = 1 input GSUM on cards

                    SSW(40)= 0 input unblocked with no DLT
                           = 1 input blocked X50 with no DLT
                           = 2 input blocked X50 with DLT
                    SSW(41)= 0 output on tape unblocked
                           = 1 output on tape blocked x 50
                    SSW(46)= 0 no effect
                           = 1 process only within specified geographic
                             bounds
                    SSW(47)= 0 no effect
                           = 1 process only within specified time interval
                           = 2 skip data within specified time interval
```

PROFG continued

INPUT continued

Card 2 GINOT initialization card
Card 3 Number of nautical miles, kilometers, or hours per inch on plot (DIFAC;F10.0)
Engineering units per inch in Y direction (YFAC;F10.0)
Number of points between time annotation (LCNT;I5)
0 For na utical miles, 1 for kilometers (MIKM;I5)
Number of plots (NPLOT;F5)
Number of files (NFILE;I5)

Card 4 Upper limit for plotting data value in eng units (ULIM;F10.0)
Lower limit for plotting data value in eng units(BLIM;F10.0)
Distance limit in inches for plotting data (DLIM;F10.0)
1 for distance along track 0 for time along track (IXDIR; I5)
Card 5 Allowable distance for length of plot before reinitialization (XALOW; F10.0)
Inches to move before reinitialization (DMOVE;F10.0)
Card 6 Starting day for processing (LIMDA; I5)
Starting month for processing (LIMMO; I5)
Starting year for processing (LIMYR; I5)
Starting hour and minute for processing (LIMHM; I5)
Card 7 Station number to be selected (MSTA; I5)

OUTPUT:

1) Printer (via F:108)
All input parameters are output to the line printer along with error messages
2) Plot tape (via F:PLOT)
A plot tape for plotting by the 30" Calcomp plotter

USAGE:

```
!JOB
!LIMIT (9T,1),(7T,1),(CORE,20),(TIME,X)
!MESSAGE  GSUM data tape info
!MESSAGE plot tape info
!ASSIGN F:1 to GSUM file
!ASSIGN F:PLOT,(DEVICE,7T),(SN,PLT1),(BIN),(UNPACK),(TRIES,10)
!LOAD (EF,(PROFG,456),(STAT,3)),(UNSAT, (305), (312), (3))
!RUN
!DATA
!EOD
```

RESTRICTIONS: None

PROFG continued

STORAGE REQUIREMENTS: 15K

SUBPROGRAMS REQUIRED: GINOT, FIND,ISW,CDATE,MCVOL,SPOT

TIMING: Undetermined

ERRORS AND DIAGNOSTICS

DLIM (date) distance limit exceeded
ULIM (date) upper limit exceeded
BLIM (date) bottom limit exceeded
END DATE PASSED end of processing

PROGRAMMER: Carl Bowin and Lee Gove

ORIGINATOR: Carl Bowin

DATE: 2 October 1975

NAME: PROJ4

TYPE: Main Program

PURPOSE: To project data onto a given line providing the data is within a given area and within a given distance from the line.

MACHINE: Sigma-7

SOURCE LANGUAGE: FORTRAN IV

PROGRAM CATEGORY: Data analysis

DESCRIPTION: This program projects several data formats to a straight line defined by input latitude and longitude of a point, and bearing from the north (0 to 360 degrees). The program can process several different formats in the same run, the order for processing being determined by a format choice input card (card 6).

The data can be output to a tape to be used in MODPLOT, TALPLOT16 and/or SAINT 2 runs when JFMT = 1 or 2 (GSUM format).

The different data formats that the program will process are:

GSUM - Gravity summary format, containing free-air and Bouguer gravity values, elevation and bathymetry.

SEAG1 or 2 - Sea gravity data format, containing corrected gravity values plus magnetics. SEAG data may be input in 1939 IGF and referenced to Potsdam (SEAG1), or in 1967 IGF and referenced to the IGSN71 (SEAG2). GSUM data may be input in 1939 IGF and referenced to Potsdam (IREC=1), or in 1967 IGF and referenced to the IGSN71 (IREC=2). For either SEAG or GSUM input, output is GSUM with IREC=2.

SPFMT - Seismic refraction data format.

SEISMICITY - U.S. Coast and Geodetic Survey data format.

ACTIVE VOLCANOES - File on active volcanoes key-punched from "Catalogue of the Active Volcanoes of the World" and supplementary references.

INPUT:

Card 1: Crustal structure section (CSS) identification card containing projection parameters.
CSS ID, ANG,DMAXM,ILAT,RILTM,ILONG,RILDM,LABEL
(10A1, 2F10.0,I4,F6.2,I4,F6.2,30A1)

CSS ID - Crustal structure section identification number (CSS-NNN).

ANG - The angle between the vertical and the straight line to which the data will be projected in the PROJ4 program (0 to 360 degrees).

DMAXM - The greatest distance in nautical miles from the reference point for which data will be accepted.

ILAT - The latitude, in degrees, of the reference point for the line. South is negative.

RILTM - The latitude, in decimal minutes, of the reference point. Note: if degrees are negative minutes must be negative also.

ILONG - The longitude, in degrees, of the reference point. West is negative.

RILDM - The longitude, in decimal minutes, of the reference point. Note: if degrees are negative minutes must be negative also.

LABEL - A label containing up to 30 alpha-numeric characters.

Cards 2-5: Four boundary cards (I4,F6.2)

2)	Degrees	Minutes	(top latitude)
3)	"	"	(bottom latitude)
4)	"	"	(left longitude)
5)	"	"	(right longitude)

Card 6: Selection of order that data formats are processed:
(9I5) 1st JFMT, 2nd JFMT, 3rd JFMT, ..., 9th JFMT.
JFMT = 1 for GSUM format.
JFMT = 2 for SEAG1 or 2 input,output is GSUM format with IREC=2.
JFMT = 3 for SPFMT format.
JFMT = 4 for SEISMICITY data format.
JFMT = 7 for Active Volcanoes.

Card 7 and following vary depending on the JFMT. Repeat cards 7 and greater for each selected format in the order given on card 6. The program terminates when JFMT = 0 or blank, or when start date = 99.

A. <u>for JFMT = 1</u> GSUM format (uses subroutine GINOT)

<u>Card 7</u>: Sense switch options. Put sense switch (0) option in column 80, all others in column corresponding to switch number.

ISW (3) = 1 to output GSUM data onto a disk file (unit 20).

ISW (4) = 1 to output intermediate values for checking (subroutine PROJ).

ISW (12)= 1 to list date identification.

ISW (26)= 1 to output on high speed printer only.

ISW (27)= 1 to suppress rewind of ITAPE at start of job.

ISW (27)=2 to suppress rewind of JTAPE at start of job.

=9 to suppress rewind of both ITAPE and JTAPE.

ISW (29)= 1 to read and test for selected source code numbers to be processed.

= 2 to read and test for selected source code numbers to be skipped.

ISW (30)= 1 for input data on cards.

ISW (31)= 1 to output data on cards.

ISW (40)= 0 to process without the DLT.

= 1 to process with bounds using the data location table (DLT).

ISW (60)= 1 to process only data with IFFC =4, ABSTRACTOR output.

ISW (61)= 1 to replace free-air, Bouguer, elevation, latitude and longitude with averaged values.

Card 8: (optional) If ISW (29) = 1 or 2, enter ISRC numbers to be processed or skipped (16I5).

Card 9: (optional) If data is input on tape, serial number of input tapes - one per card (A4). If data is not input on tape, ISW (30) must equal 1.

Card 10: (optional) If there are card(s) 9, EITP in columns 1-4.

Card 11: (optional) If data is to be output to mag tapes, serial number of output magnetic tapes, one per card (A4). If no output tapes, then no serial number cards and either ISW (31) or ISW (3) must equal 1.

Card 12: (optional) If there are card(s) 11, EOTP in columns 1-4. If no output tapes, then no Card 12.

Card 13: Start and end dates, ISKP card
ISTDA,ISTMO,ISTYR,ISTHM,IENDA,IENMO,IENYR,IENHM,
ISKP (3I2,I4,5X,3I2,I4,5X,3I5)
Start date for processing
ISTDA (day)
ISTMO (month)
ISTYR (year)
ISTHM (time of day)
End date for processing
IENDA (day)
IENMO (month)
IENYR (year)
IENHM (time of day)

ISKP Number of records to be skipped at the start of the job, is much faster than using start date only.

Use a blank card if start and end dates not used. If this card is blank, plotting begins with the first record.

B. <u>for JFMT = 2</u> SEAG1 or 2,format input,GSUM output with IREC=2(uses subroutines)
SINOT and GINOT)

<u>Card 7:</u> Sense switch options. Same as for JFMT = 1.

C. <u>for JFMT = 3</u> SPFMT format (uses subroutine PINOT)

<u>Card 7:</u> Sense switch options.
ISW (4) = 1 to output intermediate values for checking (subroutine PROJ).
ISW (26) = 1 to output to line printer.
ISW (32) = 1 to read SPFMT data on two cards.
ISW (33) = 1 to write SPFMT data on two cards.

<u>Card 8</u>: Start and end dates and ISKP. (Same as Card 13 on JFMT = 1 above).

D. <u>for JFMT = 4</u> SEISMICITY format (uses subroutine YINOT)

<u>Card 7</u>: Sense switch options.

```
ISW (4)  = 1 to output intermediate values for
             checking (subroutine pros).
ISW (26) = 1 to output to line printer.
ISW (44) = 1 to read blocked input.
ISW (45) = 1 to write blocked output
```

<u>Card 8</u>: Start and end dates and ISKP (Same as card 13 on JFMT = 1 above).

E. <u>for JFMT = 7</u>

at present there is no volcano routine.

<u>OUTPUT</u>:

On unit 2:

1) JFMT number record (I1, 20X).
2) projected data at appropriate format.
3) two records with a numeral '8' in column 1 (I1, 20x). Only one '8' record for seismicity and volcano data.

This sequence is repeated for each selected JFMT.

On unit 20 (disk): GSUM data for subsequent processing by SAINT 2 if SSW(3) = 1 (Only applies when JFMT = 1 or 2).
On unit 108 (line printer): initialization parameters.

<u>USAGE</u>: Assign cards vary depending on format. There should be a separate assign card for each JFMT input.

```
Unit 2  is for output of projected data
Unit 3  is for GSUM format input
Unit 4  is for SEAG1 format input; output is GSUM  with IREC=2
Unit 5  is for SPFMT format input
Unit 6  is for SEISMICITY format input
Unit 9  is for Active Volcano data input
Unit 20 is for disk storage of GSUM data if ISW(3) = 1.
```

To stop processing make start day = 99. If start day = 99, the program goes to 1000 and checks input format choices for format code number of zero.

RESTRICTIONS: South and west are negative.
Degrees and minutes must have the same sign
(e.g. 47°45.0' or-32° - 30.0').

STORAGE REQUIREMENTS: Unknown.

SUBPROGRAMS REQUIRED: AREAK,DNAV,ENDIO,ENDLT,EVIL,EXIT,FIND,GINOT,ISW,MCVOL,MOUNT,NAVIN,NAVOT,OBG,PINOT,PKBY,PROJ,SETSKP,SINOT,SKPREC,STAT,TODAY,UNPKBY,YBLKI,YBLKO,YINOT.

TIMING: Undetermined.

ERRORS AND DIAGNOSTICS:

MESSAGE	ERROR
Error in SKPREC, IND = 'IND'	number of records to be skipped = 0.

PROGRAMMER: Carl Bowin

ORIGINATOR: Carl Bowin

DATE: 24 February 1975

NAME: RETRIEVE

TYPE: XDS Manage Processor Program

PURPOSE: To extract data from a data base file according to user specified search criteria.

DESCRIPTION:

Retrieves data from the data files using a selective criterion applied to any part of the data record as described in the dictionary. This selection may involve a secondary file called "matchine file" to which the main data file is compared. The Manage Reference Manual gives detailed information on the use of the program.

USE:

There is a tape containing information on world seismicity (hypocenter data) from 1900 through October 1974, which is available for general use. The tape will be updated periodically, and will always be assigned the same number. The serial number if #L20.

Because of the amount of data on this tape (about 90,000 earthquakes), we recommend you retrieve the data in the area you wish to plot, using the RETRIEVE processor, before charting. A sample RETRIEVE run is included here. Input bounds are in order TOP, BOTTOM, LEFT, RIGHT. South and west are negative. For more details see the XEROX MANAGE processor manual. If a listing of the data retrieved is desired, it can be dumped using FTDUMP. For details see the Handbook for Computer Users.

The program CHART can give you plots annotated with date, depth in km, or magnitude; or as in the sample run, it can plot symbols whose type and size varies with depth and magnitude. For additional details, see the DDL Documentation for CHART.

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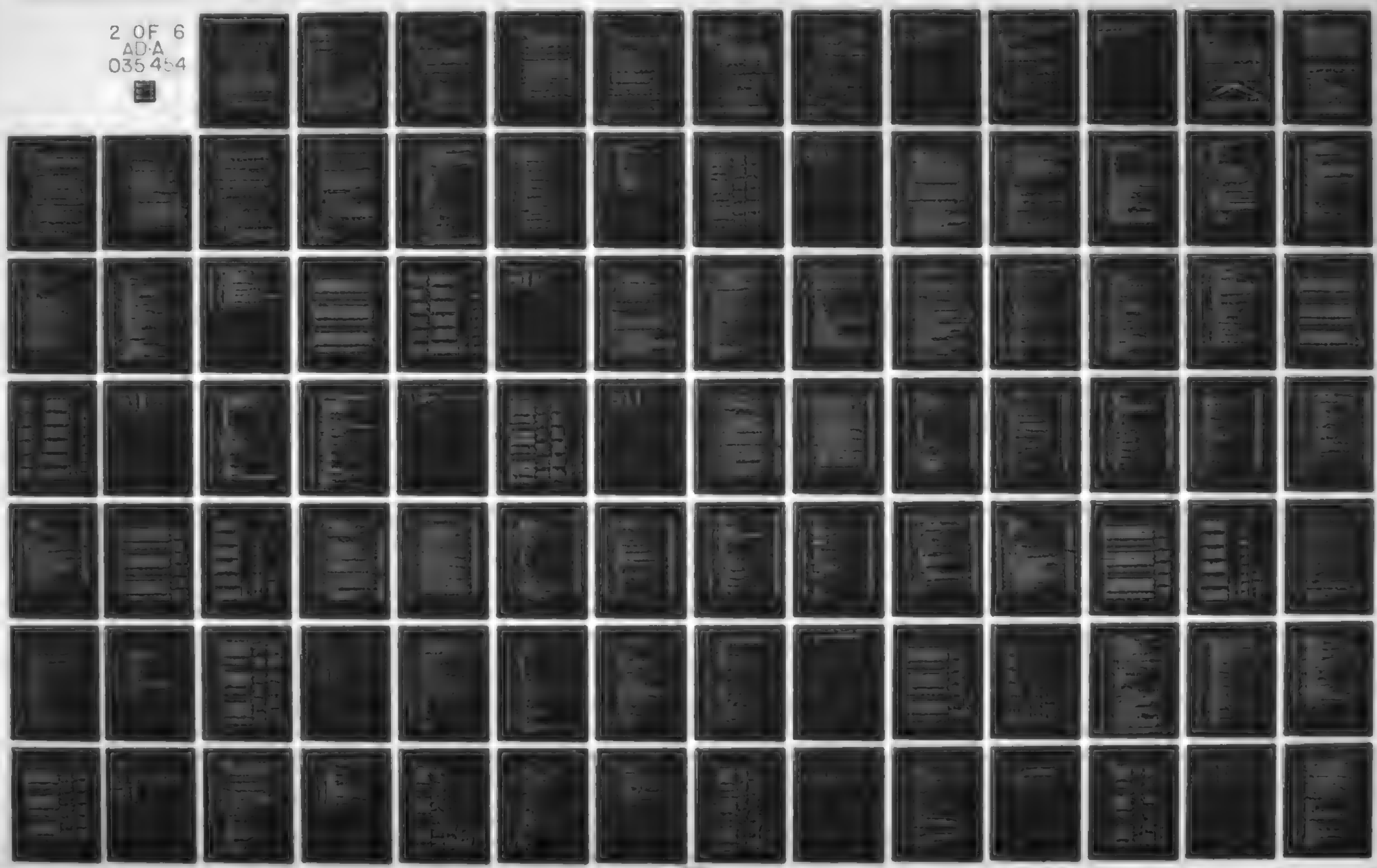
GRAVITY DATA PROCESSING PROGRAMS.(U)

CARL BOWIN

UNCLASSIFIED WOODS HOLE OCEANOGRAPHIC INSTITUTION, MA

2 OF 6
AD-A
035 454



Office Memorandum • WOODS HOLE OCEANOGRAPHIC INSTITUTION

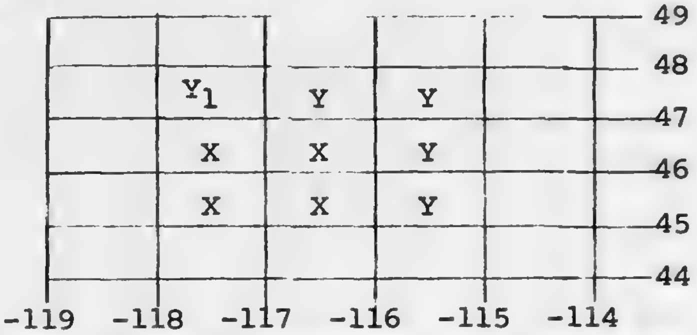
TO : Distribution DATE: 5 September 1973

FROM : Carolyn Dean

SUBJECT: Program RETRIEVE

Because of the way this program 'finds' data; what you see is not what you get.

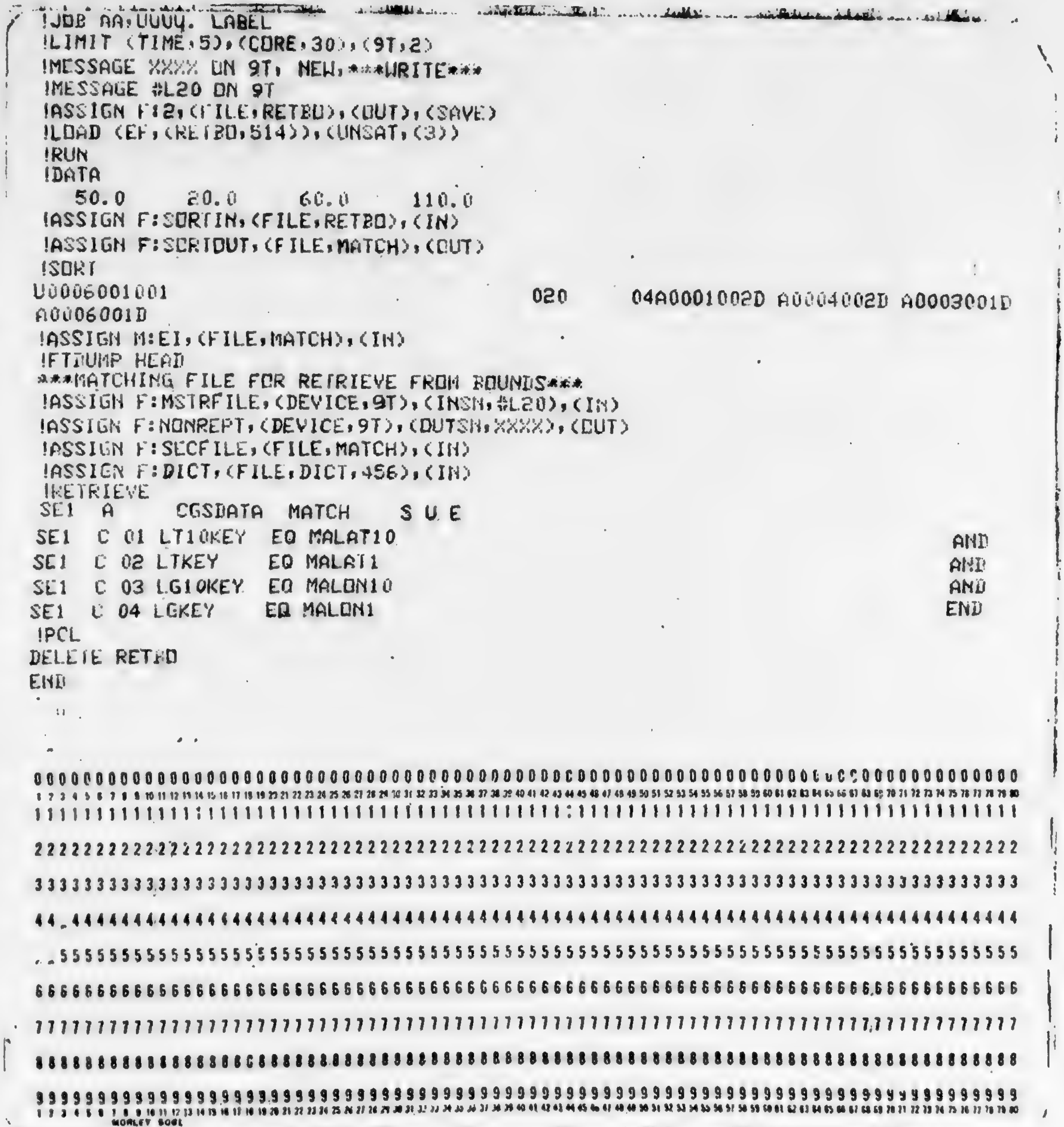
For example, suppose you are trying to retrieve all data within the bounds 47, 45, -118, -116: that is, all data in squares marked X.



The retrieve program, however, uses your input bounds to calculate keys to match against a key in the data on the input tape. The sort keys are created by adding 90 to the latitude and 180 to the longitude, in order to insure positive numbers for the codes for all points of the earth. The sort key for latitude 47 would be 137, but this code refers to data in the degree square to the north of the given latitude line. Similarly, the sort key for longitude -118 would be 62, but this number refers to the area of the degree square to the east of the given longitude line. Thus, in the example given, the code 137062 refers to the square marked Y_1.

If your input bounds are 47, 45, -118, -116, the data that will find its way to your output is all data in squares marked X and all data in squares marked Y.

Therefore, you must be aware of this quirk and learn to live with it, or you must hedge on your input bounds. To get only that data in squares marked X, your input bounds would be 46, 45, -118, -117.



```
 !JOB AA,UUUY. LABEL
 !LIMIT (TIME,5),(CORE,30),(9T,2)
 !MESSAGE XXXX ON 9T, NEW,***WRITE***
 !MESSAGE #L20 ON 9T
 !ASSIGN F:2,(FILE,RETBD),(OUT),(SAVE)
 !LOAD (EF,(RETBD,514)),(UNSAT,(3))
 !RUN
 !DATA
   50.0      20.0      60.0      110.0
 !ASSIGN F:SORTIN,(FILE,RETBD),(IN)
 !ASSIGN F:SORTOUT,(FILE,MATCH),(OUT)
 !SORT
U0006001001                                   020     04A0001002D A0004002D A0003001D
A0006001D
 !ASSIGN M:EI,(FILE,MATCH),(IN)
 !FTDUMP HEAD
 ***MATCHING FILE FOR RETRIEVE FROM BOUNDS***
 !ASSIGN F:MSTRFILE,(DEVICE,9T),(INSN,#L20),(IN)
 !ASSIGN F:NONREPT,(DEVICE,9T),(OUTSN,XXXX),(OUT)
 !ASSIGN F:SECFILE,(FILE,MATCH),(IN)
 !ASSIGN F:DICT,(FILE,DICT,456),(IN)
 !RETRIEVE
 SE1  A      CGSDATA  MATCH    S U E
SE1  C 01 LT10KEY  EQ MALAT10                                              AND
SE1  C 02 LTKEY    EQ MALAT1                                               AND
SE1  C 03 LG10KEY  EQ MALON10                                              AND
SE1  C 04 LGKEY    EQ MALON1                                               END
 !PCL
DELETE RETBD
END
```

NAME: SAINT2

TYPE: Main Program

PURPOSE: To interpolate data at even intervals

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Data Analysis

DESCRIPTION:

This program operates on GSUM format output of PROJ4, a projection program. SAINT2 will sort the data by distance along the projected line, if necessary, and then interpolate the values at even intervals of distance, if desired. Interpolation is accomplished by filtering with a polynomial function, certain parameters of which are entered at run time.

The phrase "interpolated GSUM from SAINT2" is entered in the free-field portion of the GSUM output record.

INPUT:

Card 1: Sense switch values (put a "1" in column corresponding to switch number of desired option)

ISW(1) = 1 to sort data
ISW(2) = 1 to punch sorted data
ISW(3) = 1 to print sorted data
ISW(4) = 1 to interpolate data
ISW(5) = 1 to output interpolated data in GSUM format (see ISW(11))
ISW(6) = 1 to punch interpolated free-air anomaly in format for TALPLOT
ISW(7) = 1 to print interpolated data and summary of job.
ISW(8) = 1 to print input data
ISW(9) = 1 to punch interpolated elevation data in format for TALPLOT
ISW(10)= 1 to read GSUM data from magnetic tape
ISW(11)= 0 to punch interpolated GSUM on cards (two cards per record)
= 1 to write interpolated GSUM on magnetic tape

Card 2: XKM,XSCAL,NPTS (F5.1, F5.1, I5)

XKM = distance between interpolated points in kilometers.

XSCAL = maximum distance in kilometers for which points are given unit weight in interpolation algorithm. Beyond this weight drops as X/XSCAL. Good first approximation: XSCAL = 3*XKM.

NPTS = number of points on either side of output point to be used in interpolation filtering function. Default value is 4.

Card 3: Crustal structure section (CSS) identificoation card (same card as used in PROJ4 run).

CSS ID,ANG, DMAXM, ILAT, RILTM, ILONG, RILDM, LABEL
(10A1, 2F10.0, I4, F6.2, I4, F6.2, 30A1)

CSS ID = crustal structure section identification number

ANG = the angle between the vertical and the straight line to which the data has been projected.

DMAXM = the greatest distance from the reference point for which data will be accepted, in nautical miles.

ILAT = the latitude, in degrees, of the reference point for the line. North is positive.

RILTM = the latitude, in decimal minutes, of the reference point (note: if degrees are negative, minutes must be negative, too).

ILONG = the longitude, in degrees, of the reference point. West is negative.

RILDM = the longitude, in decimal minutes, of the reference point (see note Re: RILTM)

LABEL = a label containing up to 30 alpha-numeric characters.

Card(s) 4: If ISW(10) is not set, GSUM format input data cards (output of PROJ4).

Card 5: If data is on cards, a terminator is needed. Either a !EOD card or two cards with a '9' in column 1.

OUTPUT:

On line printer: input parameters and listings controlled by sense switches.

On card punch: sorted data, GSUM format, TALPLOT elevation input, and/or TALPLOT free-air anomaly input, as requested.

On magnetic tape: Interpolated GSUM format, if desired.

USAGE:

Assign F:1 to input device (either magnetic tape or card reader)
Assign F:2 to final output tape.
Assign F:3 to RAD output file for sort
Assign F:4 to RAD input file for sort
(These must have the same file name. SAINT2 writes the file and then sorts it.)
Assign F:5 to RAD output file for output of sort. (OUT) should be on the assign card. It will be changed to (IN) by the sorter, so that SAINT2 can read it in.
Here are sample assign cards:

```
ASSIGN F:1,(DEVICE,SI)
ASSIGN F:2,(DEVICE,9T),(OUT),(SN,GN30),(TRIES,10)
ASSIGN F:3,(FILE,FILE1),(OUT),(SAVE)
ASSIGN F:4,(FILE,FILE1),(IN),(SAVE)
ASSIGN F:5,(FILE,FILE3),(OUT),(SAVE)
```

RESTRICTIONS: Maximum number of input records read is 999. The number of interpolated records will be ≤ 1000.

STORAGE REQUIREMENTS: 1575 decimal words. Requires (CORE,16) on limit card.

SUBPROGRAMS REQUIRED: AMAW, AMIW, ATSM, CLOFIL, DISAZ, DMTOR, EQN, OPIN, PICK, SETAL, THORT, WT, WTSET

TIMING: less than 3 minutes for under 150 records input, 200 records output, with two listing options selected.

ERRORS AND DIAGNOSTICS: NONE

PROGRAMMERS: Jack Wolfe, Carl Bowin, Allin Folinsbee

ORIGINATOR: Carl Bowin

DATE: 2 October 1974

NAME SELSP

TYPE: Main Program

PURPOSE: Outputs data selected according to any of several criteria

MACHINE: XDS Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Data selection

DESCRIPTION: Program CRWT3 (which see) outputs University of Toronto World Seismic Refraction Compilation in W.H.O.I. SPFMT format. SELSP will select from among this output those records satisfying the required criteria, such as quality, geographic area, geologic province, depth to mantle, or water depth. Records which satisfy the criteria specified on the input cards are output in SPFMT format. A record key of 9 causes that record to be skipped.

INPUT:

Card 1: Sense switch options (80 I1) Put sense switch 0 option in column 80, others in column corresponding to switch number.

ISW(26) = 1, to output on line printer only (sub. PINOT)
ISW(32) = 1, to read data from two cards per record (sub. PINOT)
ISW(33) = 1, to write data onto two cards per record (sub. PINOT)

Card 2: (6I5, 2F 10.0)

JMET = 1 to sort on the basis of quality
IMET degree of quality required
= 1 for reliable interpretation
= 2 for less-reliable interpretation
= 3 for unreliable interpretation
JPROV = 1 to sort on the basis of province
IPROV is the province number to be selected (see references)
IAR = 1 to sort on the basis of area bounds
IDMP = 1 to sort on the basis of mantle depth
SMIND Minimum depth to mantle in kilometers
SMAXD Maximum depth to mantle in kilometers

INPUT (continued)

Card 3: (I5, 2F10.0)

IDP = 1 to sort on the basis of water depth
=-1 to sort on basis of elevation above sea level
(land data)
DMIN minimum water depth or elevation in kilometers
DMAX maximum water depth or elevation in kilometers
(All positive values)

Cards 4-7 (optional)
Area bounds (I5, F10.0)
If IAR=1, enter top bound, bottom, left and right, in integer degrees, and minutes with decimal point, one bound per card.

Data cards (optional):
If sense switch 32 is set to one, SPFMT cards should follow, two cards per record.

OUTPUT:

To line printer: input parameters and counters of records read and written

If ISW(26)= 1, selected output records

On output device: records which satisfy selection criteria, which may be output on cards or magnetic tape.

USAGE:

Assign F:1 to input device. Unless ISW(26) or ISW(33) = 1, assign F:2 to an output tape.

RESTRICTIONS:

STORAGE REQUIREMENTS: 468 decimal words; (CORE,9) is required on LIMIT card.

SUBPROGRAMS REQUIRED: ARCK, ARLIM, EXIT, PINOT

TIMING: 5 charge units to select 100 records from 2300 (output to lister).

ERRORS AND DIAGNOSTICS: None

REFERENCES:

McConnell, R.K., and G.H. McTaggart - Cowan, Crustal Seismic Refraction Profiles, A Compilation, 1963. Univ. of Toronto, Sci. Rept. No. 8, 54 pp.

PROGRAMMER: CARL BOWIN

ORIGINATOR: CARL BOWIN

DATE: 6 August 1975

NAME: SPFMT

TYPE: Main Program

PURPOSE: Converts seismic refraction data in University of Toronto World Seismic Refraction Compilation format to W.H.O.I. SPFMT format

MACHINE: Sigma-7

SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Format conversion

DESCRIPTION:

SPFMT converts seismic refraction column data in University of Toronto World Seismic Refraction Compilation format (one or two cards per profile) to W.H.O.I. SPFMT format (each 120 character output record is one profile). Input data is assumed to be on cards.

INPUT:

card 1: Sense switches (blank card)

No sense switches ha' e been implemented for this program, available for possible future use.

card 2: data cards

card 3 blank card to signal end of input data. without this card, the last input card may not be output.

OUTPUT: On device no. 2 - seismic refraction column data in SPFMT format.

USAGE: Assign F:1 to input device; F:2 to output device

RESTRICTIONS: NONE

STORAGE REQUIREMENTS: Unknown

SUBPROGRAMS REQUIRED: EVIL, ISW, STAT

TIMING: Not determined

SPFMT

ERRORS AND DIAGNOSTICS: 'EDF FOUND, NREC =
NREC is the number of records output

PROGRAMMER: John Woodside, Carl Bowin

ORIGINATOR: Carl Bowin

DATE: 6 August 1975

NAME: TALPLOT 16

TYPE: Main program

PURPOSE: To compute gravity anomalies for a set of two-dimensional polygons

MACHINE: Sigma-7

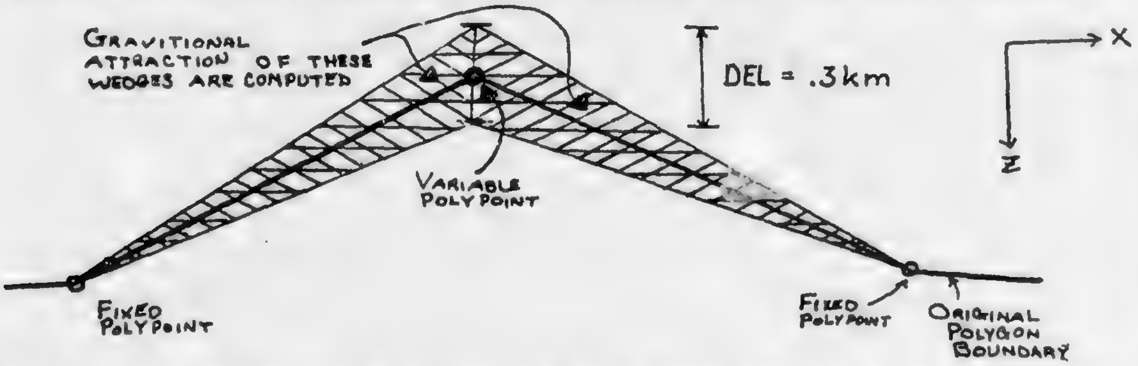
SOURCE LANGUAGE: Fortran IV

PROGRAM CATEGORY: Data analysis

DESCRIPTION:

This program uses Talwani's method for calculating the gravity anomaly for two-dimensional polygons. It sums the contributions from the set of polygons and compares the calculated result to the observed gravity which is read in at the start of the program. The calculated gravity is referenced to the observed gravity at a specified point by subtracting the value of (^{g}calculated $^{-g}$observed) at specified point from the calculated values at each point.

The program calculates the RMS difference between the calculated and observed gravity anomaly. If desired the program will modify specified points of the last polygon that is read in so as to reduce the RMS difference. This is done in the following way. For each point in the polygon that is to be modified, the effect of a change of z for this point on the gravity observed at each field point is calculated. This is done by computing the effect of thin triangles on the gravity at the field points.


GRAVITIONAL ATTRACTION OF THESE WEDGES ARE COMPUTED
DEL = .3km
X
Z
VARIABLE POLY POINT
FIXED POLYPOINT
FIXED POLYPOINT
ORIGINAL POLYGON BOUNDARY

The if we have NFIELD field points and NVAR variable polypoints (note that NVAR .LE. NFIELD) we end up with a set of over-determined equations for the change in depth of each of the variable polypoints. These NFIELD equations are reduced to NVAR equations by the standard summation method.

DESCRIPTION (continued)

The equations are solved, and the appropriate modifications are made to each of the polypoints. The new gravity contribution of the polygon is calculated, along with the RMS error. We then go back and calculate a new set of variational parameters, and then another polygon model, and so on. This loop continues until one or the other of the following two things happens: 1. the number of new polygons calculated exceeds IMAX or, 2. the RMS error decreases by less than 0.5 mgals. When this happens the program prints out the new final polygon, prints out some graphs of the observed and calculated gravity, and then stops. It also calculates the crustal weight for a 1 cm^2 column down to the base of the model. If the new polygon displaces more than one polygon, above or below, the gravity and mass calculation will be incorrect.

INPUT:

First Card:

A card containing 80 columns of alphanumeric data. This will appear at the start of the job and at start of plot. Format (20A4)

Second Card: Sense Switches (80I1)
Put ISW(0) option in column 80 and the other options in columns corresponding to the switch number.

Sense Switch Settings

```
ISW(1)  = 0 to write onto unit 2
        = 1 not to write onto unit 2
ISW(2)  = 0 sets elevation for all field points = 0
         and does not read in elevation cards
        = 1 reads in elevation cards (kilometers)
        = 2 reads in elevation cards (meters)
ISW(3)  = 0 to print intermediate data for each polygon
        = 1 does not print
ISW(4)  = 0 to plot intermediate data for each polygon
        = 1 does not plot
ISW(5)  = 0 not to plot of elevation on final plot
        = 1 to plot elevation on final plot
ISW(6)  = 1 to adjust last polygon to fit gravity data
ISW(7)  = 1 to print intermediate data for the fitting
            part of the program (debugging only)
```

TALPLOT 16 continued, page 3

INPUT (continued)

ISW(8) = 1 to disable the punching of new polygon points
ISW(9) = 1 NOT to write intermediate data for each polygon onto unit 2 (JTAPE)
ISW(12)= 1 to correct calculated weights with an elevation factor of (elev(km)*2.67*100. Use when model does not contain that part of topography above sea level.
ISW(13)=1 to print out results of input polygon before varying the boundary

Third Card: RDENS, RWGT, RHOD, REFX, FXI, DELFX, M, NFER, IMAX (6F10.2, I10,2I5)

RDENS - The reference density that is subtracted from the density of the polygons, (usually 0.0).
RWGT - The weight that is to be subtracted from the crustal weight calculated by the program. The value should be the normal weight of a normal column of material 1 cm^2 down to the bottom of the model in kg.
RHOD - The difference in density that is used by the model adjusting program. It is equal to the density of the layer below the adjustable boundary minus the density of the layer above the adjustable boundary.
REFX - The value of the X coordinate at which the calculated gravity is set equal to the observed gravity.

NFER - half length of the filter used to smooth the residuals before modifying the lower polygon boundary. If = 0 no smoothing is done.
FXI - The X coordinate for the first field point.
DELFX - Distance in Km between field points
M - The number of field points (must be .LE. to 200)
IMAX - The maximum number of times the boundaries of the last polygon will be adjusted (5 is a good number).

FOURTH Card: Observed gravity
The observed gravity values, five pe card (5F10.1) (a total of M values). If the observed gravity is not known the value of the observed gravity should set to 990.

Fifth Card: (Optional: if ISW(2)=1) elevations
Elevation of the field points in km, five per card(5F10.1) (a total of M values)

TALPLOT 16 continued, page 4

Then comes a group of cards that is repeated for each polygon

```
repeated for each polygon
        LNO, RHORK (I5,F10.3)
         XX,ZZ,ICODE,IAL (2F10.2, 2I1) a card like
         this for each polypoint.
```

```
LNO     -  The number of the polygon
        =  1 this is a water layer, and the program will
             calculate the 2-D Bouguer anomaly
        = 99 this is the last polygon in the model
        = any other number for ordinary polygon
RHORK   - The density of the polygon (in gm/cc)
XX,ZZ   - The X and Z coordinates of the polygon points.
          Note that Z is positive down and X is positive
          to the right (the coordinates are in km)
ICODE   = 9 to indicate that this is the last point in
          the polygon.
        = blank if not the last point.
          Note that the last polygon point must have the
          same coordinates as the first polygon point, and
          that the polygon should be given in a clockwise
          order.
IAL     - Used only by the boundary altering part of the program.
        = 1 to indicate that this polygon point is to be
          varied. For stability the number of points to be
          varied should be less than 1/4 the number of observed
          gravity values, although the number of points can be
          equal to the number of observed gravity values if a
          perfect fit is desired. Also, all the points in a
          boundary should not be varies as this will lead to
          instability in the model.  The final restriction is
          that the first or last point in a polygon must not be
          varied. If you wish to vary these points the polygon
          points should be reordered.
```

OUTPUT:

Onto URN 2 if ISW(1) .EQ.0

a complete duplication of the input, along with the results. This tape is used as input for the program MODPLOT.

On line printer (108)

the input parameters, and numerical tabulations and plots of the results. After each polygon the contribution of that polygon is printed and plotted, if desired.

The values tabulated are:

K - the field point number

FX(K),FZ(K) - the coordinates of the field point

ANOMALY - the anomaly contribution in mgals., and a blank column containing the weight contribution in kg.

After all polygons have been computed we get the RMS difference between the observed and calculated gravity, ignoring those points for which observed gravity is not known.

Then comes the number of points which are used in the computation of the RMS value.

If the boundary is to be varied these values appear for each iteration.

After the final new polygon has been determined the program prints out the new polygon points.

Then comes the tabulation of the final results

K,FX(K), FZ(K), as above

ANOMALY - unreferenced gravity anomaly

CALC REF- the calculated value referenced to the appropriate field point

RESIDUAL- the difference between the calculated reference value and the observed value

OBS ANOMALY - observed gravity

WEIGHT - the weight of a cm^2 column down to the bottom of the model

WGT DIFF - the weight -RWGT

WEIGHTEST - this column will be a constant number provided the bottom of the model is flat and there are no holes or overlaps of the polygon. If this column is not constant then one of the above conditions has occurred, and there is probably an error in one or more of the polygons.

OUTPUT (continued)

Then follows a line printer plot of the crustal weight, and a line printer plot of the observed, and theoretical gravity.

Onto punch (106) - new polygons points if these are calculated.

USAGE:

Input is assumed to be on cards - assign F:1 to card reader; F:2 to output device.

A crustal model is prepared which is composed of various polygons of various densities. The polygons are numbered arbitrarily, with the exception of polygon number 1, which is a water layer, and the final polygon; which must be number 99. One point of each polygon is designated the "starting point". Points define the polygons by proceeding clockwise from the starting point and ending exactly at the same point. Polygon points must be arranged in this order for input to the TALPLOT program.

RESTRICTIONS:

1. Input is assumed to be on cards
2. There can be no more than
   200 field points per model
   150 polygon points per polygon
   20 variable polygon points
3. Polygon points must be arranged in order clockwise from starting point, and the final point of each polygon must be exact by the same as the starting point. Holes or overlaps between polygons will cause strange and exciting gravity variations. To check for these, see column marked WEIGHTEST in the line printer output.

STORAGE REQUIREMENTS: Unknown

SUBPROGRAMS REQUIRED: PLOTA, PLOTER, ISW, SIMUL, WEIG2

TIMING: Unknown

ERROR AND DIAGNOSTICS: None

PROGRAMMER: Allin Folinsbee

ORIGINATOR: Allin Folinsbee

DATE: 20 July 1975

```
C     PROGRAM ABSTGC
C     PROGRAM TO ABSTRACT GCON DATA BY 10 MIN AVEREAGES
C     VERSION OF 5 NOV 75 TO CORECT CENTER LAT AND LONG
C     ORIGINAL VERSION 20 AUG 75
      DIMENSION IBUFIN(6600)
      DIMENSION IBUFOT(1184)
      DIMENSION KODE(300),KDLAT(300),KLATMIN(300)
      DIMENSION KLATDEC(300),KLONGDEC(300)
      DIMENSION KDLONG(300),KLONGMIN(300),KFA(300),KELDEP(300)
      DIMENSION KAVFA(6,6),NPTS(6,6),KAVEL(6,6)
      DIMENSION HOWFAR(6,6),KCENLAT(6,6),KCENLONG(6,6)
      DIMENSION KCENEL(6,6),KCENFA(6,6)
C                 INITIALIZATION
  100 CONTINUE
      OUTPUT 'ABSTGC VERSION OF 5 NOV 75'
      INITSW=ISW(-2)
      ITAPE=1
      JTAPE=2
      NDLT=100
      NCARD=105
      NBR=0
      NPRINT=108
      KURLAT=999
      KURLONG=999
      DO 108 J=1,6
      DO 107 I=1,6
      KAVFA(I,J)=0
      KAVEL(I,J)=0
      NPTS(I,J)=0
      KCENEL(I,J)=0
      KCENFA(I,J)=0
      HOWFAR(I,J)=999
      KCENLAT(I,J)=0
      KCENLONG(I,J)=0
  107 CONTINUE
  108 CONTINUE
      NIN=0
      NI=0
      IF(ISW(46).EQ.0) GO TO 200
C                 READ BOUNDS
      READ(NCARD,1003) KDTOP,KDBOT,KDLFT,KDRGT
      KDTOP=KDTOP+200
      KDBOT=KDBOT+200
      KDLFT=KDLFT+200
      KDRGT=KDRGT+200
      OUTPUT KDTOP,KDBOT,KDLFT,KDRGT
 1003 FORMAT(20I5)
  110 CONTINUE
      IF(ISW(46).NE.2) GO TO 200
C                 DLT I/P LOGIC
      IF(NBR.EQ.0) READ(NDLT,1004,END=900) NBR,NDLTLT,NDLTLGR,
     *    NDLTLGL
      OUTPUT NBR,NDLTLT,NDLTLGR,NDLTLGL
C                 CHECK BOUNDS
 1004 FORMAT(5X,I6,3I3)
      IF((NDLTLT.GT.KDTOP).OR.(NDLTLT.LT.KDBOT)) GO TO 150
      IF((NDLTLGL.LT.KDLFT).AND.(NDLTLGR.LT.KDLFT)) GO TO 150
      IF((NDLTLGL.GT.KDRGT).AND.(NDLTLGR.GT.KDRGT)) GO TO 150
      GO TO 200
```

```
C                      ØUTSIDE BØUNDS
  150 CØNTINUE
      ØUTPUT NBR
      IF(NBR.LT.(300-NIN)) NIN=NIN+NBR;NBR=0;GØ TØ 110
      NBR=NBR-(300-NIN)
      CALL BUFFER IN(ITAPE,0,IBUFIN(1),1650,IKEY,NI)
  151 CØNTINUE
      GØ TØ (152,155,153,154) IKEY
  152 ØUTPUT 'WAITING';GØ TØ 151
  153 ØUTPUT 'EØF WHIKE SKIPPING'; GØ TØ 900
  154 ØUTPUT 'ERRØR WHILE SKIPPING' ; GØ TØ 900
  155 CØNTINUE
      NIN=0
      GØ TØ 150
C                      INPUT LØGIC
  200 CØNTINUE
      IF(NBR.EQ.0.AND.ISW(46).EQ.2) GØ TØ 110
      IF(NIN.LT.NI) GØ TØ 220
      ØUTPUT NIN
  210 CØNTINUE
      CALL BUFFER IN(ITAPE,0,IBUFIN(1),1650,IKEY,NI)
      GØ TØ (211,215,213,214) IKEY
  211 ØUTPUT 'WAITING'; GØ TØ 210
  213 ØUTPUT 'EØF ØN INPUT'; GØ TØ 900
  214 ØUTPUT 'ERRØR ØN INPUT' ; GØ TØ 900
  215 CØNTINUE
      NI=(NI*4)/22
      DECØDE(NI*22,1001,IBUFIN(1),ND)
     *    (KØDE(I),KDLAT(I),KLATDEC(I),KDLØNG(I),KLØNGDEC(I),
     *     KELDEP(I),KFA(I),I=1,NI)
 1001 FØRMAT (300(I1,I3,I2,I3,I2,I6,I5))
      NIN=0
      DØ 218 I=1,300
         DLATMIN=(FLØAT(KLATDEC(I))/100.)*60.
      KLATMIN(I)=IFIX(DLATMIN)
      DLØNGMIN=(FLØAT(KLØNGDEC(I))/100.)*60.
      KLØNGMIN(I)=IFIX(DLØNGMIN)
  218 CØNTINUE
  220 CØNTINUE
      NIN=NIN+1
      IF(ISW(46).NE.2) GØ TØ 225
      NBR=NBR-1
      IF((KDLAT(NIN).GT.KDTØP).ØR.(KDLAT(NIN).LT.KDBØT)) GØ TØ 200
      IF((KDLØNG(NIN).LT.KDLFT).ØR.(KDLØNG(NIN).GT.KDRGT)) GØ TØ 200
  225 CØNTINUE
      IF(KURLAT.EQ.999) GØ TØ 265
      IF((KDLAT(NIN).EQ.KURLAT).AND.(KDLØNG(NIN).EQ.KURLØNG)) GØ TØ 300
C                      NEW DEGREE SQUARE
C
C                      PREPARING LAST DEGREE SQUARE FØR Ø/P
      DØ 260 I=1,6
      DØ 250 J=1,6
      KAVFA(I,J)=KAVFA(I,J)/NPTS(I,J)
      KAVEL(I,J)=KAVEL(I,J)/NPTS(I,J)
  250 CØNTINUE
  260 CØNTINUE
      ENCØDE(1184,1002,IBUFØT(1),NE)
     *     KURLAT,KURLØNG,0,0,0,0,0,
     *    ((KCENEL(I,J),KCENFA(I,J),KCENLAT(I,J),KCENLØNG(I,J),
     *     KAVEL(I,J),KAVFA(I,J),NPTS(I,J),I=1,6),J=1,6)
```

```
      CALL BUFFER ØUT(JTAPE,0,IBUFØT(1),296,JKEY,NØ)
  265 CØNTINUE
      KURLAT=KCLAT(NIN)
      KURLØNG=KCLØNG(NIN)
 1002 FØRMAT(37(I6,I6,2I2,2I6,I4))
C                   CLEARING ARRAYS BEFØRE NEW DEGREE SQUARE
      DØ 280 I=1,6
      DØ 270 J=1,6
      KAVFA(I,J)=0
      KAVEL(I,J)=0
      NPTS(I,J)=0
      KCENEL(I,J)=0
      KCENFA(I,J)=0
      HØWFAR(I,J)=999
      KCENLAT(I,J)=0
      KCENLØNG(I,J)=0
  270 CØNTINUE
  280 CØNTINUE
C                   SAME DEGREE SQUARE
  300 CØNTINUE
      I=IFIX(FLØAT(KLATMIN(NIN))/10.0)+1
      J=IFIX(FLØAT(KLØNGMIN(NIN))/10.0)+1
      IF(KLATMIN(NIN).EQ.0) I=1
      IF(KLØNGMIN(NIN).EQ.0) J=1
      KAVEL(I,J)=KAVEL(I,J)+KELDEP(NIN)
      KAVFA(I,J)=KAVFA(I,J)+KFA(NIN)
      NPTS(I,J)=NPTS(I,J)+1
      DIST=SQRT((KLATMIN(NIN)-(I*10-5))**2+(KLØNGMIN(NIN)-(J*10-5))**2)
      IF(DIST.LT.HØWFAR(I,J)) HØWFAR(I,J)=DIST;
     *    KCENLAT(I,J)=KLATDEC(NIN);
     *      KCENLØNG(I,J)=KLØNGDEC(NIN);
     *     KCENFA(I,J)=KFA(NIN);
     *KCENEL(I,J)=KELDEP(NIN)
      GØ TØ 200
  900 CØNTINUE
      STØP
      END
```

```
                             HEX    DEC                                 HEX    DEC                                 HEX    DEC
NAME     TYPE CLASS        LOC    WORDS       NAME     TYPE CLASS     LOC    WORDS       NAME     TYPE CLASS     LOC    WORDS
----     ---- -----      -------  -----       ----     ---- -----   -------  -----       ----     ---- -----   -------  -----
BUFFERIN      SPROG      EXTERN               BUFFEROU      SPROG   EXTERN               DIST        R SCALR   02A2F V       1
DLATMIN     R SCALR      02A2A V      1       DLONGMIN  R  SCALR   02A2B V      1       FLOAT       R SPROG   INTRIN
HOWFAR      R ARRAY      02960 V     36       I          I SCALR   02A1E V      1       IBUFIN      I ARRAY   00000 V    6600
IBUFOT      I ARRAY      019C8 V   1184       IFIX       I SPROG   INTRIN               IKEY        I SCALR   02A28 V       1
INITSW      I SCALR      02A14 V      1       ISW        I SPROG   EXTERN               ITAPE       I SCALR   02A15 V       1
J           I SCALR      02A1D V      1       JKEY       I SCALR   02A2D V      1       JTAPE       I SCALR   02A16 V       1
KAVEL       I ARRAY      0293C V     36       KAVFA      I ARRAY   028F4 V     36       KCENEL      I ARRAY   029CC V      36
KCENFA      I ARRAY      029F0 V     36       KCENLAT    I ARRAY   02984 V     36       KCENLONG    I ARRAY   029A8 V      36
KDBOT       I SCALR      02A22 V      1       KDLAT      I ARRAY   01F54 V    300       KDLFT       I SCALR   02A23 V       1
KDLONG      I ARRAY      02444 V    300       KORGT      I SCALR   02A24 V      1       KDTOP       I SCALR   02A21 V       1
KELDEP      I ARRAY      027C8 V    300       KFA        I ARRAY   0269C V    300       KLATDEC     I ARRAY   021EC V     300
KLATMIN     I ARRAY      020C0 V    300       KLONGDEC   I ARRAY   02318 V    300       KLONGMIN    I ARRAY   02570 V     300
KODE        I ARRAY      01E68 V    300       KURLAT     I SCALR   02A1B V      1       KURLONG     I SCALR   02A1C V       1
NBR         I SCALR      02A19 V      1       NCARD      I SCALR   02A18 V      1       ND          I SCALR   02A29 V       1
NDLT        I SCALR      02A17 V      1       NDLTLGL    I SCALR   02A27 V      1       NDLTLGR     I SCALR   02A26 V       1
NDLTLT      I SCALR      02A25 V      1       NE         I SCALR   02A2C V      1       NI          I SCALR   02A20 V       1
NIN         I SCALR      02A1F V      1       NO         I SCALR   02A2E V      1       NPRINT      I SCALR   02A1A V       1
NPTS        I ARRAY      02918 V     36       SQRT       R SPROG   INTRIN

        HEX             HEX             HEX             HEX             HEX             HEX
LABEL   LOC     LABEL   LOC     LABEL   LOC     LABEL   LOC     LABEL   LOC     LABEL   LOC
-----  -----    -----  -----    -----  -----    -----  -----    -----  -----    -----  -----
  100  00001      107  0003A      108  0003C      110  00070      150  000AE      151  000CB
  152  00004      153  000DC      154  000E7      155  000F3      200  000F6      210  00108
  211  00119      213  00121      214  0012B      215  00135      218  00179      220  0017B
  225  0019C      250  001A9      260  001AB      265  001F2      270  00218      280  0021A
  300  0021C      900  00275     1001  0015C     1002  001F8     1003  0006D     1004  00097

LOCAL VARIABLES (10800 WORDS):

   00000 IBUFIN      019C8 IBUFOT     01E68 KODE        01F54 KDLAT      020C0 KLATMIN    021EC KLATDEC
   02318 KLONGDEC    02444 KDLONG     0257C KLONGMIN    0269C KFA        027C8 KELDEP     028F4 KAVFA
   02918 NPTS        0293C KAVEL      0296C HOWFAR      02984 KCENLAT    029A8 KCENLONG   029CC KCENEL
   029F0 KCENFA      02A14 INITS      02A15 ITAPE       02A16 JTAPE      02A17 NDLT       02A18 NCARD
   02A19 NBR         02A1A NPRINT     02A1B KURLAT      02A1C KURLONG    02A1D J          02A1E I
   02A1F NIN         02A20 NI         02A21 KDTOP       02A22 KDBOT      02A23 KDLFT      02A24 KORGT
   02A25 NDLTLT      02A26 NDLTLGR    02A27 NDLTLGL     02A28 IKEY       02A29 ND         02A2A DLATMIN
   02A2B DLONGMIN    02A2C NE         02A2D JKEY        02A2E NO         02A2F DIST

BLANK COMMON (0 WORDS)

INTRINSIC SUBPROGRAMS USED:

   FLOAT       IFIX        SQRT

EXTERNAL SUBPROGRAMS REQUIRED:

   BUFFERIN    BUFFEROU    ISW         F:101       F:103       F:105       F:106       M:DO
   M:OC        9BCDRDEE    9BCDREAD    9DECODE     9ENCODE     9ENDIOL     9INITIAL    9IODATA
   9ITOR       9PRINT      9RTOI       9SQRT       9STOP
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                       DEC       HEX
                      WØRDS     WØRDS
                      -----     -----
    GENERATED CØDE:    631      00277
         CØNSTANTS:     10      0000A
   LØCAL VARIABLES:  10800      02A30
             TEMPS:      1      00001
                      -----     -----
     TØTAL PRØGRAM:  11442      02CB2
```

```
      OUTPUT ' ','PROGRAM CHART - VERSION OF 29 SEPTEMBER 1975'
      OUTPUT ' ',' '
C       PROGRAM CHART
C *   PERMIT READING OF DDLS BLOCKED DATA TAPES USING SUB. GETO2
C         17 SEPTEMBER 1975
C *   ALLOW FOR ANNOTATING EVERY N HOURS USING ISW(71)
C *   ADD ABORTSET CALL AND JUMP TO READ BRACH (310S) 17 JUNE 1975
C                 VERSION OF 14 NOV 74, TO CORRECT MERIDIONAL PARTS
C                        FOR SPHERICAL PLANET
C                 VERSION OF 14 SEPT 1973, SSW 20 & 21 FOR SIZE CONTROL
C                        ON SEISMICITY ANOTATION IF SSW(16)=1
C            VERSION OF 7 SEPT 1973, ADDING DATE CHECK TO SEISMICITY ANOT
C                 AND CHANGE SIZE OF SEISMICITY SYMBOLS THROUGH SSW 15
C  PROGRAM PRODUCES MERCADOR CHARTS FROM FIXSE DATA, SEAG DATA, GSUM DATA,
C  MBATR DATA, OR CALCM DATA, WITH VALUES PLOTTED BY POINTS OR ALONG TRACK.
C  WITH TIME ANNOTATION OPTION, DATE IS WRITTEN AT EACH CHANGE OF DAY.
C  THIS PROGRAM ALSO WILL PLOT AND ANNOTATE FROM TABULATIONS OF SEISMIC
C  REFRACTION, EARTHQUAKE EPICENTER, VOLCANO, AND HEAT FLOW DATA.
C
C SUBROUTINES USED: GRID2, OLINE, WHR, STAT, ISW,SPOT2, CALCOMP ROUTINES, RETBY,
C  VETBY, TODAY, ARLIM, ENDIO, EVIL, SHTV, DMTOR, FIND, GETG,
C  GETS, GETF, GETY, GETV, GETL, GETX, ANOV2, POSTAP, GETO2
C
C1 PLOT LABEL
C2 SENSE SWITCH OPTIONS
C3 TIME INTERVAL - READS START AND END DATE.  IF TAPE INPUT, TAPE CAN BE PRE-
C  POSITIONED BY SPECIFYING RECORDS TO BE SKIPPED.  IF NO END DATE SPECIFIED,
C  NO TEST MADE FOR END DATE.
C4 PLOT FORMATS  1. SCALE IN INCHES PER DEGREE LONGITUDE  2. CONNECT PLOTTED
C  POINTS  3. PLOT EVERY NTH POINT  4. PLOTTING EVERY NTH GRID LINE
C  5. PLOT NUMBER  6. VALUE TO BE ANNOTED  7. ANNOTE EVERY NTH POINT  8. FORMAT
C5 PLOT FORMATS CONTINUED  1. =1  2. CHARACTER HEIGHT (=0.07 INCH)  3. INTEGER
C  OR NON-INTEGER CHART BOUNDS  4. DIGITS AFTER DECIMAL POINT PLOTTED
C6 PLOT BOUNDARIES - TOP, BOTTOM, LEFT, AND RIGHT EDGES - IN DEGREES AND MINUTES
C
C
C   SSW(0) UP TO NOT READ ANY INPUT DATA,  PLOT ONLY GRID
C   SSW(1) UP TO DELETE DRAWING NDEG GRID LINES (IN GRID2)
C   SSW(2) UP IF NEXT PLOT WILL BE ON THE SAME GRID AS THIS PLOT.
C          ALSO, UP TO ADD CURRENT VELOCITIES TO SHIP'S VELOCITY
C           FOR JFMT = 2 AND BLOCK .GT. 0 (IN SUB. GETO2)
C   SSW(3) UP TO ANNOTATE ONLY AT CHANGE OF DAY
C   SSW(4) =0 FOR NO MARK AT DATA POINT
C          =1 FOR PLOTTING A CIRCLE AROUND DATA POINT
C          =2 FOR PLOTTING A DOT AT DATA POINT
C   SSW(5) =0 TO MAKE DEGREE ANNOTATIONS INSIDE GRID (CHARACTER SIZE 0.07 INCH)
C          =1 TO MAKE DEGREE ANNOTATIONS OUTSIDE GRID (CHARACTER SIZE 0.21 INCH)
C          =2 TO MAKE DEGREE ANNOTATIONS OUTSIDE GRID (CHARACTER SIZE 0.35 INCH)
C   SSW(6) FOR MULTIPLOT RUNS, UP WILL PUT AN EOF BETWEEN PLOTS.  USEFUL TO PDP-5
C          OPERATOR IN THE EVENT OF MECHANICAL MALFUNCTION OF PEN.
C   SSW(7) UP TO ANNOTATE ON LEFT SIDE OF TRACK
C          DOWN TO ANNOTATE ON RIGHT SIDE OF TRACK
C   SSW(8) UP TO SUPPRESS PLOTTING OF GRID
C   SSW(9) UP TO LIST DATE AND TIME OF DATA OUT OF CHART BOUNDARIES
C  SSW(10) UP TO CALL SUBROUTINE MOUNT WHICH READS IN SERIAL NUMBER OF INPUT TAPE
C          USED FOR PLOTS HAVING TWO OR MORE INPUT TAPES
C  SSW(11) UP TO ANNOTATE POINTS ALTERNATELY ON LEFT AND RIGHT SIDES OF TRACK
C  SSW(12) UP TO LIST DATE OF DATA JUST READ FOR IDENTIFICATION
C  SSW(13) UP IF TWO OR MORE PLOTS ARE BEING MADE FROM THE SAME TAPE AND THIS IS
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C          NØT THE LAST PLØT.  TAPE WILL BE PØSITIØNED AT BEGINNING ØF CURRENT
C          FILE EVEN IF END-ØF-FILE PASSED.
C  SSW(15) =N FØR ADDITIØNAL SIZE INCREMENT IN PLØTTING SYMBØLS IF
C               SSW(16)=1
C  SSW(16) UP TØ PLØT SPØT FØR SEISMICITY DATA PRØPØRTIØNAL TØ MAG AND DEPTH
C  SSW(17) =0 TØ PLØT AN X FØR SEISMICITY DATA PRE-1961
C          =1 FØR PRE-1961 SEISMICITY DATA TØ VARY ACCØRDING TØ MAG AND DEPTH
C          =9 NØT TØ PLØT PRE-1961 DATA
C  SSW(18) =0 TØ MAKE ANNØTATIØN AT RIGHT ANGLES TØ INCREMENTAL TRACK  (ANØV2)
C          =1 TØ MAKE ANNØTATIØNS HØRIZØNTALLY
C          =2 TØ MAKE ANNØTATIØNS VERTICALLY
C          =3 TØ INVERT ANNØTATIØNS FØR HEADINGS 180 TØ 269
C  SSW(19) =0 FØR EARTH MERIDIØNAL PARTS FRØM BØWDITCH
C          =1 FØR MERIDIØNAL PARTS FØR SPHERICAL PLANET
C  SSW(20) =N,(SEISMICITY) FØR ADDITIØNAL SIZE INCREMENT FØR ALL DATA PTS.
C  SSW(21) =N,(SEISMICITY) FØR SIZE FACTØR BY WHICH PLØTTING SYMBØLS WILL
C               VARY ACCØRDING TØ MAGNITUDE. IF N=0, THEN ANØV4 SETS N=2.
C  SSW(25)= 1 TØ READ DATA IN ASCII CØDING RATHER THAN EBCDIC
C             (FØR JFMT = 1, 4, AND 5 WITH BLØCK = 0)
C  SSW(71) = N TØ ANNØTATE EVERY N HØURS ØN THE HØUR
C
      DIMENSIØN IBUF(1000),LABELP(20),NØW(4),IEND(4)
      INTEGER BLØCK
C
       IIN = 105
       IIØUT = 108
      IFMT=0
      INYR=0
       MFILE=0
      CALL ABØRTSET(310S,15)
C     PRINT DATE AND TIME ØF JØB ØN HEADING
      CALL TØDAY(NØW)
      WRITE(IIØUT,13) NØW
   13 FØRMAT(1X,4A4)
      WRITE(IIØUT,9)
    9 FØRMAT('PRØGRAM CHART',9X,'ANNØTATED MERCATØR CHARTS USING FIXSE,
     1SEAG, GSUM, MBATR, AND CALCM DATA FØRMATS.,/, ØTHER ØPTIØNS PLØT S
     2EIS REFR, SEISMICITY, VØLCANØES, HEAT FLØW, LUNAR, AND USER SUPPLI
     3ED FØRMAT')
        CALL SETSKP(IND)
   10   CALL PLØTS (IBUF, -1000)
C  MØVE PEN IN FRØM EDGE AND ALØNG PAPER SØ THAT IF LETTERING ØUTSIDE GRID WILL
C  NØT RUN ØFF EDGE.
        CALL PLØT(1.0,0.5,-3)
        CALL STAT
   79   IFLAG=0
CARD 1  PLØT LABEL (20A4)
C     PUT LABEL ØN LEFT MARGIN ØF PLØT - SHIP, CRUISE, DATE, AND AREA. 80 CHAR.
      READ(IIN,6,END=91,ERR=91) LABELP(I), I=1,20
    6 FØRMAT(20A4)
      WRITE (IIØUT,7) LABELP(I), I=1,20
    7 FØRMAT(//'PLØT LABEL; ',20A4)
CARD 2  SENSE SWITCH ØPTIØNS - SW1 TØ SW79 IN CØLUMNS 1 TØ 79, SW0 IN CØLUMN 80
        INZ = ISW(-2)
      IF(ISW(19).EQ.0) ØUTPUT 'MERIDIØNAL PARTS FØR EARTH FRØM BØWDITCH'
      IF(ISW(19).EQ.1) ØUTPUT 'MERIDIØNAL PARTS FØR A SPHERICAL PLANET'
      ITAPE=1
       IF((ISW(10).EQ.1)) READ(IIN,6) NAME;  CALL MØUNT(ITAPE,NAME);
    1 WRITE(IIØUT,5784) NAME
5784   FØRMAT( 'USING INPUT TAPE NUMBER' 1X,A4)
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C      POSITION LABEL DEPENDING WHETHER ANNOTATION INSIDE OR OUTSIDE GRID
       PLACE=-0.80
       IF (ISW(5).EQ.1) PLACE=-1.35
       CALL SYMBOL(PLACE,1.0,0.14,LABELP,90.0,80)
C      ANNOTATE DATE CHART MADE IN LOWER LEFT CORNER OF PLOT
       CALL SYMBOL(PLACE,-0.48,0.07,NOW,0.0,16)
       CALL PLOT(0.0,0.0,3)
C
CARD 3  TIME INTERVAL OF DATA, AND IF TAPE INPUT - POSITION ON TAPE.
    5   INIT=1
        JODA=0
        JOMO=0
        JOYR=0
        JOHM=0
        NY=1
        NZ=1
        NW=1
        IEOD=0
        IGAP=0
        IAGAP=0
        NPTS=0
        IPCT=0
         RADEG=57.29578
         DEGRA=1.745329E-2
       READ(IIN,2) ISTDA,ISTMO,ISTYR,ISTHM,IENDA,IENMO,IENYR,IENHM,ISKP,
      1ISFIL,IBCKUP
     2 FORMAT(3I2,I4,5X,3I2,I4,5X,3I5)
        WRITE(IIOUT,6365)ISTDA,ISTMO,ISTYR,ISTHM,IENDA,IENMO,IENYR,
      1 IENHM,ISKP,ISFIL
  6365 FORMAT('START DATE ',3I2,1X,I4,5X,'END DATE ',3I2,1X,I4,5X,'RECORD
      1S SKIPPED TO START OF INTERVAL (ISKP): ',I4,/2X,'FILES SKIPPED TO
      2START OF INTERVAL (ISFIL): ',I4)
        IF(IBCKUP.NE.0) WRITE(IIOUT,17) IBCKUP
    17 FORMAT('  SERIES OF OVERLAPPING CHARTS BEING MADE, OVERLAP OF NEXT
      1 CHART ON THIS CHART WILL BE ',I4,' RECORDS.')
C  SPACING FILES ON MULTIFILE INPUT TAPES
       IF(ISFIL.EQ.0) GO TO 11
       CALL SKPFIL(ITAPE,ISFIL,'FWD')
       GO TO (997,11,11,997,997,997) IND
C  SPACING RECORDS ON INPUT TAPE
   11  IF(ISKP.EQ.0) GO TO  8
       IF(ISKP.GT.0) CALL SKPREC(ITAPE,ISKP,'FWD')
       IF(ISKP.LT.0) ISKP=-ISKP; CALL SKPREC(ITAPE,ISKP,'REV')
       GO TO (999,8,999,999,999,999) IND
CARD 4  PLOT FORMAT PARAMETERS
    8  READ(IIN,3)SINCH,ITRK,LCNT,NDEG,NUMPL,NPTA,JFMT,NX,NFILE
    3 FORMAT(F10.0,3I5,1X,A4,4I5)
       IF(JFMT .EQ. 1) IFMT=4
       IF(JFMT .EQ. 2) IFMT=1
       IF(JFMT .EQ. 4) IFMT=3
       IF(JFMT .EQ. 5) IFMT=2
       IF(IFMT .EQ. 0) OUTPUT ' ',' READ ROUTINE IS NOT GET02',' '
        WRITE(IIOUT,6498) SINCH,ITRK,LCNT,NDEG,NUMPL,NPTA,JFMT,NX
  6498 FORMAT('CHART SCALE (SINCH) =',F7.3,' INCHES PER DEGREE LONGITUDE'
      1,4X,'TRACK POINTS CONNECTED (ITRK):',I2,4X,'PLOTTING EVERY NTH POI
      2NT (LCNT):',I2,/2X,'PLOTTING EVERY NTH DEGREE LINE (NDEG):',I2,4X,
      3'PLOT NUMBER (NUMPL):',A4,4X,'ANNOTATE EVERY NTH PLOTTED POINT (NP
      4TA):',I2,/2X,'DATA FORMAT (JFMT):',I2,4X,'VALUE ANNOTATED (NX):',
      5I2)
        WRITE(IIOUT,6493) NFILE
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 6493 FØRMAT(' NUMBER ØF FILES BEING ØUTPUTTED ØN SAME GRID (NFILE):'I3)
C       JFMT SPECIFIES THE FØRMAT ØF THE DATA
C          1 ... FIX DATA
C          2 ... SEAG1 DATA
C   JFMT   3 ... GSUM DATA
C          4 ... MBATR DATA
C          5 ... CALCM DATA
C          6 ... STATN DATA
C          7 ...SPFMT DATA
C          9... VØLCANØES
C          10...HEAT FLØW
C          11...LUNAR DATA
C          12...FLEXIBLE (SUPPLIED BY USER)
C
        NSKIP=LCNT-1
        NSTØP=LCNT
        MSTØP=NPTA
CARD 5  PLØT FØRMAT PARAMETERS
      READ(IIN,4) KPT,KHT,ICTYP,IDEC,BLØCK
    4 FØRMAT(5G)
      WRITE(IIØUT,6499) KPT,KHT,ICTYP,IDEC, BLØCK
 6499 FØRMAT('MAGNIFICATIØN FACTØR (KPT)=',I2,4X,'CHARACTER HEIGHT *0.07
     1 INCH (KHT)=',I2,4X,'NØN-INTEGER ØR INTEGER CHART BØUNDS (ICTYP):'
     2,I2,/2X,'DECIMAL PØINT IN ANNØTATIØN (IDEC):',I2,/
     $    ' USING THE DDLS BLØCKED TAPES (NØ/YES).(0/1): ',F3.0/)
C
C       IDEC=N FØR N DIGITS TØ RIGHT ØF DECIMAL PT. IN SUBR ANØV2 ANNØTATIØN
C                     =0   DECIMAL PT ØNLY
C                     -1   SUPPRESS DECIMAL PØINT
        ZZ = KPT
        SINCH = SINCH * ZZ
        ZHT=KPT*KHT
CARD 6  PLØT BØUNDARIES           (CARDS 6 TØ 9 IF NØN-INTEGER BØUNDS)
C       ITØP, IBØT, ILEFT, IRIGT READ IN BY RETBY
      WRITE(IIØUT,6364)
 6364 FØRMAT('CHART BØUNDARIES:',20X,'EAST AND NØRTH PØSITIVE')
        IF(ICTYP)205,205,210
  210   CALL RETBY
     A( IDATA,IEØD,IIN,IIØUT,ITAPE,NUMPL,DATA,RLAT,RLØNG,KØGHM,IAGAP,LCN
     BT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTØP,ITØP,RBØT,IBØT,RLEFT,
     C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBØT,FTØP,FLEFT,FRIGT,NDEG,
     D SLAT,SLØNG,BØTMP,XX,YY,INIT,XØLD,YØLD)
        GØ TØ 230
C       DEGREES AND MINUTES FØR RTØP, RBØT, RLEFT, RRIGT READ IN BY
C       ARLIM AS CALLED BY VETBY
  205   CALL VETBY
     A( IDATA,IEØD,IIN,IIØUT,ITAPE,NUMPL,DATA,RLAT,RLØNG,KØGHM,IAGAP,LCN
     BT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTØP,ITØP,RBØT,IBØT,RLEFT,
     C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBØT,FTØP,FLEFT,FRIGT,NDEG,
     D SLAT,SLØNG,BØTMP,XX,YY,INIT,XØLD,YØLD)
  230   CØNTINUE
C
C *   INITIALIZE GET02
C
      IF(JFMT .EQ. 1 .ØR.
     $    JFMT .EQ. 4  .ØR.
     $    JFMT .EQ. 5  .ØR.
     $    BLØCK .GT. 0
     $    ) CALL GET02(ITAPE,0,
     $    JDA,JMØ,JYR,JHM,RLAT,RLØNG,NX,NY,NZ,NW,
          $   DATAX,DATAY,DATAZ,DATAW,ITRK,LCNT,NPTA,IDEC,
          $   IEØD,IAGAP,IFMT,INYR,BLØCK)
           IF(ISW(19).EQ.1) GØ TØ 240
 C         TØ SET ØRIGIN. MERIDIØNAL PARTS FRØM BØWDITCH
           A = ABS(RBØT)/2.0+(45.0*DEGRA)
           B = (ALØG(SIN(A)/CØS(A))) * 0.4342945
           BØTMP=7.915704E+03 *B-(23.26893*SIN(ABS(RBØT
          1 )))-(0.0525*(SIN(ABS(RBØT)))**3)
           GØ TØ 15
     240   CØNTINUE
 C         TØ SET ØRIGIN - MERIDIØNAL PARTS FØR SPHERICAL PLANET
           A=ABS(RBØT)/2.0+(45.0*DEGRA)
           B=(ALØG(SIN(A)/CØS(A)))
           BØTMP=3437.747*B
      15   IF(RBØT) 20,30,30
      20   BØTMP = -BØTMP
      30   IF(ICTYP)22,22,32
 C        SUBRØUTINE ØLINE FØR GRID ENCLØSED BY NØN-INTEGER DEGREES
 22              CALL ØLINE(ZZ,ZHT,
        A  IDATA,IEØD,IIN,IIØUT,ITAPE,NUMPL,DATA,RLAT,RLØNG,KØGHM,IAGAP,LCN
        BT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTØP,ITØP,RBØT,IBØT,RLEFT,
        C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBØT,FTØP,FLEFT,FRIGT,NDEG,
        D SLAT,SLØNG,BØTMP,XX,YY,INIT,XØLD,YØLD)
 C         CHECKING IF ØNLY DRAWING ØF GRID WANTED
           IF(ISW(0))310,310,91
 C
 C        SUBRØUTINE GRID2 FØR GRID ENCLØSED BY WHØLE DEGREES
      32 CALL GRID2(ZZ,ZHT,NUMPL,DEGRA,FDEG2,RDEG2,RTØP,ITØP,RBØT,IBØT,
         1 RLEFT,ILEFT,RRIGT,IRIGT,SINCH,SMP,FBØT,FTØP,FLEFT,FRIGT,NDEG,
         2 SLAT,SLØNG,BØTMP)
 C         CHECKING IF ØNLY DRAWING ØF GRID WANTED
           IF(ISW(0))310,310,91
 C
 C END ØF INITIALIZATIØN, BEGIN PLØTTING PØINTS
 C
 C  CHECKING IF TRACK PØINTS SHØULD BE CØNNECTED
      35   IF(ITRK)40,40,45
      40   IP = 3
           GØ TØ 70
      45   IF(INIT) 55,55,50
      50   IP = 3
           GØ TØ 70
      55   IF(IGAP) 65,65,60
      60   IP = 3
           GØ TØ 70
      65   IP = 2
 C  PLØT DATA PØINT
      70   SLAT = RLAT
           SLØNG = RLØNG
          CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
           CALL PLØT(XX,YY,IP)
           IPCT=IPCT+1
          IF(ISW(16)) 73,73,710
     710   CALL ANØV4(XX,YY,DATAZ,DATAW,JYR)
           GØ TØ 72
 C           CHECK FØR TYPE ØF DATA PØINT ANNØTATIØN MADE IN SPØT2
      73   CALL SPØT2(XX,YY)
      74   DATA=DATAX
           IF(NX)71,72,71
      71   MSTØP=MSTØP-1
      IF(MSTØP)871,871,72
  871 CØNTINUE
C
C     TEST FØR TIME ANNØTATED AT 2 HØUR INTERVALS
C
      IF(ISW(71)) 872,878,872
  872 IF(JDA - JØDA) 875,873,875
  873 IF(FLØAT(JHM/100) - FLØAT(JØHM/100)) 874,72,874
  874 ITCT=ITCT + 1
      IF(ITCT .LT. ISW(71)) GØ TØ 72
  875 ITCT=0
  878 CØNTINUE
      CALL ANØV2(ZZ,ZHT,NX,JDA,JMØ,JYR,JHM,JØDA,XX,YY,INIT,DATA,IDEC)
       MSTØP=NPTA
   72  INIT = 0
       RLTØ = RLAT
       RLGØ = RLØNG
       JØDA=JDA
       JØMØ=JMØ
       JØYR=JYR
       JØHM=JHM
        NPTS=NPTS+1
C  DATA PØINT PLØTTED, INPUT NEXT DATA PØINT
C INPUT DATA FØRMATS:  308 FIXSE  308 SEAG1  311 GSUM  308 MBATR  308 CALCM
C   314 STATN  340 SPFMT  342 SEISMICITY  344 VØLCANØES  346 HEAT FLØW
C   348 LUNAR DATA  350 FLEXIBLE (USER SUPPLIED)
  310 GØ TØ (308,308,311,308,308,314,340,342,344,346,348,350) JFMT
  308 CØNTINUE
      IF(BLØCK .EQ. 0 .AND. JFMT .EQ. 2) CALL GETS(ITAPE,
     $   NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,RLAT,RLØNG,
     $   JDA,JMØ,JYR,JHM,IEØD) ; GØ TØ 78
      CALL GETO2(ITAPE,1,
     $   JDA,JMØ,JYR,JHM,RLAT,RLØNG,NX,NY,NZ,NW,
     $   DATAX,DATAY,DATAZ,DATAW,ITRK,LCNT,NPTA,IDEC,
     $   IEØD,IAGAP,IFMT,INYR,BLØCK)
       GØ TØ 78
  311  CALL GETG (ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,JDA,JMØ,JYR,JHM,IEØD)
      GØ TØ 78
  314 CALL GETST(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,JDA,JMØ,JYR,JHM,IEØD)
      GØ TØ 78
  340 CALL GETP(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,RLAT,RLØNG,
     1JDA,JMØ,JYR,JHM,IEØD)
      GØ TØ 78
  342 CALL GETY(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,RLAT,RLØNG,
     1JDA,JMØ,JYR,JHM,IEØD)
      GØ TØ 78
  344  CALL GETV (ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,JDA,JMØ,JYR,JHM,IEØD)
       GØ TØ 78
  346  CALL GETH (ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,JDA,JMØ,JYR,JHM,IEØD)
      GØ TØ 78
  348  CALL GETL (ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,JDA,JMØ,JYR,JHM,IEØD)
      GØ TØ 78
  350  CALL GETX (ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,JDA,JMØ,JYR,JHM,IEØD)
C
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   78  IF  (IEOD-1) 85,1212,1212
1212   NFILE=NFILE-1
        IF(NFILE.LE.0) GO TO 12
       INIT = 1
        IEOD=0
        MFILE=MFILE+1
       OUTPUT 'PLOTTING CONTINUES FROM NEXT FILE'
       GO TO 310
C
C  END OF DATA FILE - CHECK SENSE SWITCHES FOR NEXT STEP
C
C CHECKING IF ANOTHER PLOT FOLLOWS OR TO EXIT
   12 IF(ISW(2).EQ.0.AND.ISW(13).EQ.0.AND.IBCKUP.EQ.0) GO TO 91
       IF(ISW(2).EQ.1) CALL PLOT(0.0,0.0,3)
C      SENSE SWITCH 13 CHECKS WHETHER ANOTHER PLOT IS TO BE MADE FROM SAME FILE
       IF(ISW(13)) 80,81,80
   80 IBACK=0
       IF(IEOD.EQ.1) IBACK=1
        IF(MFILE.NE.0)    IBACK=MFILE+1
       CALL SKPFIL(ITAPE,IBACK,'REV')
C      SEQUENTIAL PLOTS FROM SAME FILE WITH (IBCKUP) OVERLAP
   81 IF(IBCKUP.EQ.0) GO TO 96
       IBCKUP=IBCKUP+1
       IF(IEOD.EQ.0) CALL SKPREC(ITAPE,IBCKUP,'REV')
       IF(IEOD.EQ.1) CALL SKPFIL(ITAPE,1,'REV')
C      ESTABLISH ORIGIN OF NEW PLOT
   96 IF (ISW(2).EQ.1) GO TO 95
       XINCRE=ABS(RDEG2)*RADEG*SINCH+4.00
       CALL PLOT(XINCRE,0.0,-3)
   95 IF(ISW(6).EQ.1) CALL PLOT(-1.00,-0.50,999); GO TO 94
C      PUT  RUN AND  DATA CARDS FOLLOWING LAST DATA DECK TO REINITIALIZE PROGRAM.
       GO TO 79
C  CLOSE PLOT TAPE AND END-OF-JOB LABEL FOR PDP-5 OPERATOR
       DATA (IEND(I),I=1,4) /'END OF CHART JOB'/
   91 XINCRE=ABS(RDEG2)*RADEG*SINCH+1.00
C  COMPLETE BOTTOM AND RIGHT SIDES OF FIDUCIAL HALF-INCH SQUARE DRAWN IN GRID2
        CALL PLOT(XINCRE,-0.5,-3)
        CALL PLOT(0.5,0.0,-2)
        CALL PLOT(0.0,0.5,-2)
        CALL PLOT(2.5,-0.5,-3)
        CALL SYMBOL(0.0,0.0,0.42,IEND,90.0,16)
        CALL PLOT(4.0,0.0,999)
   94  IF(ISW(10).EQ.1) CALL MREL(1)
        WRITE(IOUT,97)IPCT
   97  FORMAT('  NUMBER POINTS PLOTTED = ',I8)
        CALL EXIT
C
C      SKIPPING POINTS, IF EVERY POINT NOT TO BE PLOTTED.
   85  IF(NSKIP) 186,186,185
  185  CALL SKPREC(ITAPE,NSKIP)
       GO TO (999,186,1212,999,1212,999)  IND
C  CHECK IF DATE IS WITHIN SPECIFIED TIME INTERVAL
C      IFLAG IS A FLAG TO ALLOW SKIPPING THE FIRST CALL TO FIND
C        IF WE HAVE ALREADY  FOUND THE STARTING DATE
  186  IF(IFLAG.NE.0) GO TO 82
       CALL FIND(ISTDA,ISTMO,ISTYR,ISTHM,JDA,JMO,JYR,JHM,INDK)
        IF(INDK.EQ.-1) GO TO 310
        IFLAG=1
   82  IF(IENYR.EQ.0) GO TO 851
       CALL FIND(IENDA,IENMO,IENYR,IENHM,JDA,JMO,JYR,JHM,INDK)
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            IF(INDK.EQ.1) GØ TØ  995
C  CHECKING IF DATA WITHIN CHART BØUNDRIES
  851  NSTØP=LCNT
         IF(RTØP-RLAT) 100,100,86
   86  IF(RLAT-RBØT) 100,88,88
   88  IF(RLØNG-RLEFT) 100,90,90
   90  IF(RRIGT-RLØNG) 100,100,35
C  DATA ØUTSIDE ØF BØUNDS
C  WRITING ØUT DATE IF DATA PØINT IS ØUT ØF BØUNDS
  100 INIT=1
       IF(ISW(9))410,310,410
  410  WRITE(IIØUT,420)JDA,JMØ,JYR,JHM
  420  FØRMAT('ØØB ',3I2,1X,I4)
      GØ TØ 310
995    WRITE(IIØUT,996) JDA,JMØ,JYR,JHM
996    FØRMAT('END DATE PASSED',2X,3I2,1X,I4)
      GØ TØ 12
C     ERRØR MESSAGES IF MISTAKE IN TAPE FILE ØR RECØRD SPACING,
999    WRITE(IIØUT,998) IND
998   FØRMAT('ERRØR IN SKPREC, IND=',I2)
      GØ TØ 91
  997 WRITE(IIØUT,994) IND
  994 FØRMAT('ERRØR IN SKPFIL, IND=',I2)
      GØ TØ 91
      END
```

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                      HEX     DEC                                HEX     DEC                               HEX     DEC
NAME   TYPE CLASS     LOC    WORDS      NAME    TYPE CLASS       LOC    WORDS      NAME   TYPE CLASS       LOC    WORDS
----   ---- -----   -------  -----      ----    ---- -----     -------  -----      ----   ---- -----     -------  -----
A         R SCALR   00464 V      1      ABORTSET     SPROG     EXTERN              ABS       R SPROG     INTRIN
ALOG      R SPROG   INTRIN              ANOV2        SPROG     EXTERN              ANOV4       SPROG     EXTERN
B         R SCALR   00465 V      1      BLOCK      I SCALR     004C4 V      1      BOTMP     R SCALR     00457 V      1
COS       R SPROG   INTRIN              DATA       R SCALR     0043E V      1      DATAW     R SCALR     00463 V      1
DATAX     R SCALR   00460 V      1      DATAY      R SCALR     00461 V      1      DATAZ     R SCALR     00462 V      1
DEGRA     R SCALR   0041F V      1      EXIT         SPROG     EXTERN              FBOT      R SCALR     00451 V      1
FDEG2     R SCALR   00444 V      1      FIND         SPROG     EXTERN              FLEFT     R SCALR     00453 V      1
FLOAT     R SPROG   INTRIN              FRIGT      R SCALR     00454 V      1      FTOP      R SCALR     00452 V      1
GETG        SPROG   EXTERN              GETH         SPROG     EXTERN              GETL        SPROG     EXTERN
GETP        SPROG   EXTERN              GETS         SPROG     EXTERN              GETST       SPROG     EXTERN
GETV        SPROG   EXTERN              GETX         SPROG     EXTERN              GETY        SPROG     EXTERN
GETO2       SPROG   EXTERN              GRID2        SPROG     EXTERN              I         I SCALR     0040C V      1
IAGAP     I SCALR   0041B V      1      IBACK      I SCALR     0046A V      1      IBCKUP    I SCALR     0042A V      1
IBOT      I SCALR   00449 V      1      IBUF       I ARRAY     00000 V   1000      ICTYP     I SCALR     00439 V      1
IDATA     I SCALR   0043D V      1      IDEC       I SCALR     0043A V      1      IDEG2     I SCALR     00443 V      1
IEND      I ARRAY   00400 V      4      IENDA      I SCALR     00424 V      1      IENHM     I SCALR     00427 V      1
IENMO     I SCALR   00425 V      1      IENYR      I SCALR     00426 V      1      IEOD      I SCALR     00419 V      1
IFLAG     I SCALR   0040B V      1      IFMT       I SCALR     00407 V      1      IGAP      I SCALR     0041A V      1
IIN       I SCALR   00405 V      1      IIOUT      I SCALR     00406 V      1      ILEFT     I SCALR     0044B V      1
IND       I SCALR   0040A V      1      INCK       I SCALR     0046C V      1      INIT      I SCALR     00411 V      1
INYR      I SCALR   00408 V      1      INZ        I SCALR     004CD V      1      IP        I SCALR     00466 V      1
IPCT      I SCALR   0041D V      1      IRIGT      I SCALR     0044D V      1      ISFIL     I SCALR     00429 V      1
ISKP      I SCALR   00428 V      1      ISTDA      I SCALR     00420 V      1      ISTHM     I SCALR     00423 V      1
ISTMO     I SCALR   00421 V      1      ISTYR      I SCALR     00422 V      1      ISW       I SPROG     EXTERN
ITAPE     I SCALR   004CE V      1      ITCT       I SCALR     00467 V      1      ITOP      I SCALR     00447 V      1
ITRK      I SCALR   0042C V      1      JDA        I SCALR     0045C V      1      JFMT      I SCALR     00431 V      1
JHM       I SCALR   0045F V      1      JMO        I SCALR     0045D V      1      JODA      I SCALR     00412 V      1
JOHM      I SCALR   00415 V      1      JOMO       I SCALR     00413 V      1      JOYR      I SCALR     00414 V      1
JYR       I SCALR   0045E V      1      KDEG2      I SCALR     00442 V      1      KHT       I SCALR     00438 V      1
KOGHM     I SCALR   00441 V      1      KPT        I SCALR     00437 V      1      LABELP    I ARRAY     003E8 V     20
LCNT      I SCALR   0042D V      1      MFILE      I SCALR     00409 V      1      MOUNT       SPROG     EXTERN
MREL        SPROG   EXTERN              MSTOP      I SCALR     00436 V      1      NAME      I SCALR     0040F V      1
NDEG      I SCALR   0042E V      1      NFILE      I SCALR     00433 V      1      NOW       I ARRAY     003FC V      4
NPTA      I SCALR   00430 V      1      NPTS       I SCALR     0041C V      1      NSKIP     I SCALR     00434 V      1
NSTOP     I SCALR   00435 V      1      NUMPL      I SCALR     0042F V      1      NW        I SCALR     00418 V      1
NX        I SCALR   00432 V      1      NY         I SCALR     00416 V      1      NZ        I SCALR     00417 V      1
OLINE       SPROG   EXTERN              PLACE      R SCALR     00410 V      1      PLOT        SPROG     EXTERN
PLOTS       SPROG   EXTERN              RADEG      R SCALR     0041E V      1      RBOT      R SCALR     00448 V      1
RDEG2     R SCALR   00445 V      1      RETBY        SPROG     EXTERN              RLAT      R SCALR     0043F V      1
RLEFT     R SCALR   0044A V      1      RLGO       R SCALR     00469 V      1      RLONG     R SCALR     00440 V      1
RLTO      R SCALR   00468 V      1      RRIGT      R SCALR     0044C V      1      RTOP      R SCALR     00446 V      1
SETSKP      SPROG   EXTERN              SIN        R SPROG     INTRIN              SINCH     R SCALR     0042B V      1
SKPFIL      SPROG   EXTERN              SKPREC       SPROG     EXTERN              SLAT      R SCALR     00455 V      1
SLGK      R SCALR   0044F V      1      SLONG      R SCALR     00456 V      1      SLTK      R SCALR     0044E V      1
SMP       R SCALR   00450 V      1      SPOT2        SPROG     EXTERN              STAT        SPROG     EXTERN
SYMBOL      SPROG   EXTERN              TODAY        SPROG     EXTERN              VETBY       SPROG     EXTERN
WHR         SPROG   EXTERN              XINCRE     R SCALR     0046B V      1      XOLD      R SCALR     0045A V      1
XX        R SCALR   00458 V      1      YOLC       R SCALR     0045B V      1      YY        R SCALR     00459 V      1
ZHT       R SCALR   0043C V      1      ZZ         R SCALR     0043B V      1


        HEX              HEX               HEX               HEX               HEX                HEX
LABEL   LOC     LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC       LABEL    LOC
-----  -----    -----   -----     -----   -----     -----   -----     -----   -----      -----   -----
    2  CC139        3   001C8         4   CC288         5   CC1CC         6   00C3B          7   [illegible]
    8  CC1CB        9   00038        10   CC06F        11   CC1AD        12   005[illegible]     13   [illegible]
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  15  CC3A5       17  0017F       20  C03A7       22  C03AC       30  003AA       32  003E1
  35  CC401       40  004C3       45  CC406       50  C0408       55  0040B       60  0040D
  65  CC41C       70  00412       71  C043E       72  C046B       73  00436       74  0043A
  78  0C556       79  0007A       80  CC58B       81  C059C       82  0062B       85  00608
  86  0C640       88  00643       90  00646       91  C05C9       94  005EF       95  005BD
  96  0C5AE       97  005FC      100  00649      125  C060A      186  00619      205  0031A
 210  CC2EC      230  00347      240  CC393      300  C048B      310  0047A      311  004BF
 314  C04D2      340  004E5      342  C04F8      344  C050B      346  0051E      348  00531
 350  CC544      410  00650      420  0C658      710  C042E      851  0063B      871  00441
 872  00446      873  00449      874  00452      875  00458      878  0045A      994  00684
 995  0065F      996  00667      997  C067F      998  C0676      999  00671     1212  00559
5784  000E4     6364  C02DC     6365  CC14F     6493  C0268     6498  00210     6499  00293

LØCAL VARIABLES (1133 WØRDS):

  0000C IBUF      003E8 LABELP    003FC NØW       0040C IEND      00404 BLØCK     00405 IIN
  00406 IIØUT     00407 IFMT      00408 INYR      00409 MFILE     0040A IND       0040B IFLAG
  0040C I         0040D INZ       004CE ITAPE     004CF NAME      00410 PLACE     00411 INIT
  00412 JØDA      00413 JØMØ      00414 JØYR      00415 JØHM      00416 NY        00417 NZ
  C0418 NW        00419 IEØD      0041A IGAP      0041B IAGAP     0041C NPTS      0041D IPCT
  0041E RADEG     0041F DEGRA     0042C ISTDA     00421 ISTMØ     00422 ISTYR     00423 ISTHM
  00424 IENDA     00425 IENMØ     00426 IENYR     00427 IENHM     00428 ISKP      00429 ISFIL
  0042A IBCKUP    0042B SINCH     0042C ITRK      0042D LCNT      0042E NDEG      0042F NUMPL
  0043C NPTA      00431 JFMT      00432 NX        00433 NFILE     00434 NSKIP     00435 NSTØP
  00436 MSTØP     0C437 KPT       00438 KHT       00439 ICTYP     0043A IDEC      0043B ZZ
  0043C ZHT       0043D IDATA     0043E DATA      0043F RLAT      00440 RLØNG     00441 KØGHM
  00442 KDEG2     00443 IDEG2     00444 FDEG2     00445 RDEG2     00446 RTØP      00447 ITØP
  00448 RBØT      00449 IBØT      0044A RLEFT     0044B ILEFT     0044C RRIGT     0044D IRIGT
  0044E SLTK      0044F SLGK      0045C SMP       00451 FBØT      00452 FTØP      00453 FLEFT
  00454 FRIGT     00455 SLAT      00456 SLØNG     00457 BØTMP     00458 XX        00459 YY
  0045A XØLD      0C45B YØLD      0045C JDA       0045D JMØ       0045E JYR       0045F JHM
  00460 CATAX     00461 DATAY     00462 DATAZ     00463 DATAW     00464 A         00465 B
  00466 IP        00467 ITCT      00468 RLTØ      00469 RLGØ      0046A IBACK     0046B XINCRE
  0046C INDK

BLANK CØMMØN (0 WØRDS)

INTRINSIC SUBPRØGRAMS USED:

  ABS        ALØG       CØS        FLØAT      SIN

EXTERNAL SUBPRØGRAMS REQUIRED:

  ABØRTSET   ANØV2      ANØV4      EXIT       FIND       GETG       GETH       GETL
  GETP       GETS       GETST      GETV       GETX       GETY       GETØ2      GRID2
  ISW        MØUNT      MREL       ØLINE      PLØT       PLØTS      RETBY      SETSKP
  SKPFIL     SKPREC     SPØT2      STAT       SYMBØL     TØDAY      VETBY      WHR
  F:101      F:1C2      F:103      F:104      F:105      F:106      F:108      M:DØ
  M:ØC       9ALØG      9BCDRDEE   9BCDREAD   9BCDWRIT   9CØS       9ENDIØL    9INITIAL.
  9IØDATA    9IØLUSA    9ITØR      9PRINT     9SIN
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HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC       HEX
                     WØRDS     WØRDS
                     -----     -----
   GENERATED CØDE:   1678      0068E
        CØNSTANTS:     44      0002C
  LØCAL VARIABLES:   1133      0046D
            TEMPS:      3      00003
                     -----     -----
    TØTAL PRØGRAM:   2858      00B2A
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C       PRØGRAM CHARTG
C
C      VERSIØN ØN 4 FEB 76 TØ IMPLEMENT SSW(71)
C      VERSIØN ØF 26 ØCT 75 TØ USE GABS FØRMAT
C                        VERSIØN ØF 13 SEPT 75 TØ USE GCØN
C               INPUT JFMT NUMBER
C  PRØGRAM CHARTG, ADAPTED FRØM CHART3
C  PRØGRAM CHART3, ADAPTED FRØM CHART AND CHART2 ØN 28 JUNE 1971
C
C     VERSIØN ØF MAY 30 1973
C      VERSIØN ØF 24 JANUARY READS ØNLY GSUM
C          VERSIØN ØF 20 DEC 1971,  ADD ØPTIØN TØ PLØT ØNLY GRID
C          VERSIØN ØF 8 ØCT 1971,  CHANGE LØCATIØN ØF PLØT ØF TIME
C          VERSIØN ØF 5 ØCT 1971, ADDING CØUNTER TØ PØINTS PLØTTED
C          VERSIØN ØF 23 SEPT 1971,  PUTTING LØCAL VARIABLES IN CØMMØN
C         VERSIØN ØF 2 SEPT 1971,  CHANGING TØ SPØT2
C
C  PRØGRAM PRØDUCES MERCADØR CHARTS FRØM GSUM DATA
C       WITH VALUES PLØTTED BY PØINTS ØR ALØNG TRACK
C  WITH TIME ANNØTATIØN ØPTIØN, DATE IS WRITTEN AT EACH CHANGE ØF DAY.
C
C
C
C
C SUBRØUTINES USED; GRID2, ØLINE, WHR, STAT, ISW,SPØT2, CALCØMP RØUTINES, RETRY,
C  VETØY, TØDAY, ARLIM, ENDIØ, EVIL, SHTV, DMYØR, FIND,
C       ANØV2, PØSTAP
C
C
C1 PLØT LABEL
C2 SENSE SWITCH ØPTIØNS
C3 TIME INTERVAL - READS START AND END DATE.  IF TAPE INPUT, TAPE CAN BE PRE-
C  PØSITIØNED BY SPECIFYING RECØRDS TØ BE SKIPPED.  IF NØT END DATE SPECIFIED
C  NØ TEST MADE FØR END DATE.
C4 PLØT FØRMATS  1. SCALE IN INCHES PER DEGREE LØNGITUDE  2. CØNNECT PLØTTED
C  PØINTS  3. PLØT EVERY NTH PØINT  4. PLØTTING EVERY NTH GRID LINE
C  5. PLØT NUMBER  6. VALUE TØ BE ANNØTED  7. ANNØTE EVERY NTH PØINT  8. FØRMAT
C5 PLØT FØRMATS CØNTINUED  1. =1  2. CHARACTER HEIGHT (*0.07 INCH)  3. INTEGER
C  ØR NØN-INTEGER CHART BØUNDS  4. DIGITS AFTER DECIMAL PØINT PLØTTED
C6 PLØT BØUNDARIES - TØP, BØTTØM, LEFT, AND RIGHT EDGES - IN DEGREES AND MINUTES
C
C
C  SSW(0) UP TØ NØT READ ANY INPUT DATA,  PLØT ØNLY GRID
C  SSW(1) UP TØ DELETE DRAWING NDEG LINES
C  SSW(2) UP IF NEXT PLØT WILL BE ØN THE SAME GRID AS THIS PLØT.
C  SSW(3) UP TØ ANNØTATE ØNLY AT CHANGE ØF DAY
C  SSW(4) =0 FØR NØ MARK AT DATA PØINT
C         =1 FØR PLØTTING A CIRCLE ARØUND DATA PØINT
C         =2 FØR PLØTTING A DØT AT DATA PØINT
C  SSW(5) =0 TØ MAKE DEGREE ANNØTATIØNS INSIDE GRID (CHARACTER SIZE 0.07 INCH)
C         =1 TØ MAKE DEGREE ANNØTATIØNS ØUTSIDE GRID (CHARACTER SIZE 0.21 INCH)
C         =2 TØ MAKE DEGREE ANNØTATIØNS ØUTSIDE GRID (CHARACTER SIZE 0.35 INCH)
C  SSW(6) FØR MULTIPLØT RUNS, UP WILL PUT AN EØF BETWEEN PLØTS.  USEFUL TØ PDP-5
C         ØPERATØR IN THE EVENT ØF MECHANICAL MALFUNCTIØN ØF PEN.
C  SSW(7) UP TØ ANNØTATE ØN LEFT SIDE ØF TRACK
C         DØWN TØ ANNØTATE ØN RIGHT SIDE ØF TRACK
C  SSW(8) UP TØ SUPPRESS PLØTTING ØF GRID
C  SSW(9) UP TØ LIST DATE AND TIME ØF DATA ØUT ØF CHART BØUNDARIES
C SSW(10) UP TØ CALL SUBRØUTINE MØUNT WHICH READS IN SERIAL NUMBER ØF INPUT TAPE
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C        USED FØR PLØTS HAVING TWØ ØR MØRE INPUT TAPES
C  SSW(11) UP TØ ANNØTATE PØINTS ALTERNATELY ØN LEFT AND RIGHT SIDES ØF TRACK
C  SSW(12) UP TØ LIST DATE ØF DATA JUST READ FØR IDENTIFICATIØN
C  SSW(13) UP IF TWØ ØR MØRE PLØTS ARE BEING MADE FRØM THE SAME TAPE AND THIS IS
C          NØT THE LAST PLØT.  TAPE WILL BE PØSITIØNED AT BEGINNING ØF
C          FILE EVEN IF END-ØF-FILE PASSED.
C  SSW(18) =0 TØ MAKE ANNØTATIØN AT RIGHT ANGLES TØ INCREMENTAL TRACK  (ABOVE)
C          =1 TØ MAKE ANNØTATIØNS HØRIZØNTALLY
C          =2 TØ MAKE ANNØTATIØNS VERTICALLY
C           =3 TØ INVERT ANNØTATIØNS FØR HEADINGS 180 TØ 269
C  SSW(19) =0 FØR EARTH MERIDIØNAL PARTS FRØM BØWDITCH
C          =1 FØR MERIDIØNAL PARTS FØR SPHERICAL PLANET
C   SSW(71)=N TØ ANNØTATE EVERY N HØURS
C
C
      DIMENSIØN IBUF(1000),LABELP(20),NØW(4),IEND(4)
       CØMMØN  IBUF, LABELP, NØW,       IIN, IIØUT,
     1 MFILE, IND, IFLAG, I, NZERØ, NWØN,
     2 ZERØ, INZ, ITAPE, NAME, PLACE, INIT,
     3 XØLD, YØLD, JØDA, JØMØ, JØYR, JØHM,
     4 NY, NZ, NW, IEØD, IGAP, IAGAP
       CØMMØN NPTS, ISTDA, ISTMØ, ISTYR, ISTHM, IENDA,
     1 IENMØ, IENYR, IENHM, ISKP, ISFIL, IBCKUP,
     2 RADEG, DEGRA, SINCH, ITRK, LCNT, NDEG,
     3 NUMPL, NX, NPTA, JFMT, NFILE, NSKIP,
     4 NSTØP, MSTØP, KPT, KHT, ICTYP, IDEC
       CØMMØN ZZ, ZHT, IDATA, DATA, RLAT, RLØNG,
     1 KØGHM, KDEG2, IDEG2, FDEG2, RDEG2, RTØP,
     2 ITØP, RBØT, IBØT, RLEFT, ILEFT, RRIGT,
     3 IRIGT, SLTK, SLGK, SMP, FBØT, FTØP,
     4 FLEFT, FRIGT, SLAT, SLØNG, BØTMP, XX
       CØMMØN YY, A, B, IP, DATAZ, DATAW,
     1 DATAX, JDA, JMØ, JYR, JHM, RLTØ,
     2 RLGØ, DATAY, KGDA, KGMØ, KGYR, KGHM,
     3 IBACK, XINCRE, INDK
C
       IIN = 105
       IIØUT = 108
       MFILE=0
C     PRINT DATE AND TIME ØF JØB ØN HEADING
      CALL TØDAY(NØW)
      WRITE(IIØUT,13) NØW
   13 FØRMAT(1X,4A4)
      ØUTPUT 'PRØGRAM CHARTG VERSIØN ØF 4 FEB 76'
C
       CALL SETSKP(IND)
   10  CALL PLØTS (IBUF, -1000)
C  MØVE PEN IN FRØM EDGE AND ALØNG PAPER SØ THAT IF ØUTSIDE GRID LETTERING WILL
C  NØT RUN ØFF EDGE.
       CALL PLØT(0.5,0.5,-3)
       CALL STAT
   79  IFLAG=0
CARD 1  PLØT LABEL (20A4)
C     PUT LABEL ØN LEFT MARGIN ØF PLØT - SHIP, CRUISE, DATE, AND AREA. 80 CHAR.
      READ(IIN,6,END=91,ERR=91) LABELP(I), I=1,20
      IF (ISW(5).EQ.1) PLACE=-1.35
    6 FØRMAT(20A4)
      WRITE (IIØUT,7) LABELP(I), I=1,20
    7 FØRMAT(//'PLØT LABEL' ',20A4)
       NZERØ=0
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          NWON=1
          ZERO=0.0
CARD 2  SENSE SWITCH OPTIONS - SW1 TO SW79 IN COLUMNS 1 TO 79, SW0 IN COLUMN 80
          INZ = ISW(-2)
         IF(ISW(19).EQ.0) OUTPUT 'MERIDIONAL PARTS FOR EARTH FROM BOWDITCH'
         IF(ISW(19).EQ.1) OUTPUT 'MERIDIONAL PARTS FOR A SPHERICAL PLANET'
           ITAPE=1
          IF((ISW(10).EQ.1))READ(IIN,5765) NAME ,CALL MOUNT(ITAPE,NAME)
        *,WRITE(IIOUT,5784) NAME
5784      FORMAT( 'USING INPUT TAPE NUMBER' 1X,A4)
5765      FORMAT(A4)
C        POSITION LABEL DEPENDING WHETHER ANNOTATION INSIDE OR OUTSIDE GRID
         PLACE=-0.80
         CALL SYMBOL(PLACE,0.5,0.14,LABELP,90.0,80)
C        ANNOTATE DATE CHART MADE IN LOWER LEFT CORNER OF PLOT
         CALL SYMBOL(PLACE,-0.48,0.07,NOW,0.0,16)
         CALL PLOT(0.0,0.0,3)
C
C
CARD 3  TIME INTERVAL OF DATA, AND IF TAPE INPUT - POSITION ON TAPE.
     5    INIT=NWON
          XOLD=ZERO
          YOLD=ZERO
          JODA=NZERO
          JOMO=NZERO
          JOYR=NZERO
          JOHM=NZERO
          NY=NWON
          NZ=NWON
          NW=NWON
          IEOD=NZERO
          IGAP=NZERO
          IAGAP=NZERO
          NPTS=NZERO
          IPCT=NZERO
           RADEG=57.29578
           DEGRA=1.745329E-2
         READ(IIN,2) ISTDA,ISTMO,ISTYR,ISTHM,IENDA,IENMO,IENYR,IENHM,ISKP,
        1ISFIL,IBCKUP
       2 FORMAT(3I2,I4,5X,3I2,I4,5X,3I5)
          WRITE(IIOUT,6365)ISTDA,ISTMO,ISTYR,ISTHM,IENDA,IENMO,IENYR,
        1 IENHM,ISKP,ISFIL
  6365 FORMAT(' START DATE ',3I2,1X,I4,5X,' END DATE ',3I2,1X,I4,5X,'RECORD
        1S SKIPPED TO START OF INTERVAL (ISKP): ',I4,/2X,'FILES SKIPPED TO
        2START OF INTERVAL (ISFIL): ',I4)
C  SPACING FILES ON MULTIFILE INPUT TAPES
         IF(ISFIL.EQ.0) GO TO 11
         CALL SKPFIL(ITAPE,ISFIL,'FWD')
         GO TO (997,11,11,997,997,997) IND
C  SPACING RECORDS ON INPUT TAPE
    11   IF(ISKP.EQ.0) GO TO  8
CARD 4  PLOT FORMAT PARAMETERS
     8   READ(IIN,3)SINCH,ITRK,LCNT,NDEG,NUMPL,NPTA,JFMT,NX,NFILE,IBLK
     3   FORMAT(F10.0,3I5,A5,5I5)
         WRITE(IIOUT,6498) SINCH,ITRK,LCNT,NDEG,NUMPL,NPTA,JFMT,NX,IBLK
  6498 FORMAT('CHART SCALE (SINCH) =',F7.3,' INCHES PER DEGREE LONGITUDE'
        1,4X,'TRACK POINTS CONNECTED (ITRK):',I2,4X,'PLOTTING EVERY NTH POI
        2NT (LCNT):',I2,/2X,'PLOTTING EVERY NTH DEGREE LINE (NDEG):',I2,4X,
        3'PLOT NUMBER (NUMPL):',A5,4X,'ANNOTATE EVERY NTH PLOTTED POINT (NP
        4TA):',I2,/2X,'DATA FORMAT (JFMT):',I2,4X,'VALUE ANNOTATED (NX):',
     *  I2,/,2X,'BLOCKING FACTOR OF INPUT TAPE(IBLK)!',I4)
      WRITE(IIOUT,6493) NFILE
 6493 FORMAT(' NUMBER OF FILES BEING OUTPUTTED ON SAME GRID (NFILE)!'
C  JFMT  3 ... GSUM DATA
C
       NSKIP=LCNT-1
       NSTOP=LCNT
       MSTOP=NPTA
CARD 5  PLOT FORMAT PARAMETERS
       READ(IIN,4)KPT,KHT,ICTYP,IDEC
 4     FORMAT (4I5)
      WRITE(IIOUT,6499) KPT,KHT,ICTYP,IDEC
 6499 FORMAT('MAGNIFICATION FACTOR (KPT)=',I2,4X,'CHARACTER HEIGHT =
     1 INCH (KHT)=',I2,4X,'NON-INTEGER OR INTEGER CHART BOUNDS (ICTYP)
     2,I2,/2X,'DECIMAL POINT IN ANNOTATION (IDEC)!',I2)
C
C      IDEC=VARIABLE FOR DECIMAL POINT IN ANOV ANOTATION
C      IDEC=N FOR N DIGITS TO RIGHT OF DECIMAL PT.
C                        =0   DECIMAL PT ONLY
C                        -1   SUPPRESS DECIMAL POINT
       ZZ = KPT
       SINCH = SINCH * ZZ
       ZHT=KPT*KHT
CARD 6  PLOT BOUNDARIES             (CARDS 6 TO 9 IF NON-INTEGER BOUNDS)
C      ITOP, IBOT, ILEFT, IRIGT READ IN BY RETBY
      WRITE(IIOUT,6364)
 6364 FORMAT('CHART BOUNDARIES!',20X,'EAST AND NORTH POSITIVE')
       IF(ICTYP)205,205,210
  210  CALL RETBY
     A( IDATA,IEOD,IIN,IIOUT,ITAPE,NUMPL,DATA,RLAT,RLONG,KOGHM,IAGAP,LCN
     BT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTOP,ITOP,RBOT,IBOT,RLEFT,
     C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBOT,FTOP,FLEFT,FRIGT,NDEG,
     D SLAT,SLONG,BOTMP,XX,YY,INIT,XOLD,YOLD)
       GO TO 230
C      DEGREES AND MINUTES FOR RTOP, RBOT, RLEFT, RRIGT READ IN BY
C      ARLIM AS CALLED BY VETBY
  205  CALL VETBY
     A( IDATA,IEOD,IIN,IIOUT,ITAPE,NUMPL,DATA,RLAT,RLONG,KOGHM,IAGAP,LCN
     BT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTOP,ITOP,RBOT,IBOT,RLEFT,
     C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBOT,FTOP,FLEFT,FRIGT,NDEG,
     D SLAT,SLONG,BOTMP,XX,YY,INIT,XOLD,YOLD)
  230  A = ABS(RBOT)/2.0+(45.0*DEGRA)
       B = (ALOG(SIN(A)/COS(A))) * 0.4342945
       BOTMP=7.915704E+03 *B-(23.26893*SIN(ABS(RBOT
     1 )))-(0.0525*(SIN(ABS(RBOT)))**3)
       IF(RBOT) 20,30,30
   20  BOTMP = -BOTMP
   30  IF(ICTYP)22,22,32
C     SUBROUTINE ALINE FOR GRID ENCLOSED BY NON-INTEGER DEGREES
22          CALL ALINE(ZZ,ZHT,
     A  IDATA,IEND,IIN,IIOUT,ITAPE,NUMPL,DATA,RLAT,RLONG,KOGHM,IAGAP,LCN
     BT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTOP,ITOP,RBOT,IBOT,RLEFT,
     C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBOT,FTOP,FLEFT,FRIGT,NDEG,
     D SLAT,SLONG,BOTMP,XX,YY,INIT,XOLD,YOLD)
C
C      CHECKING IF ONLY DRAWING OF GRID WANTED
C
       IF(ISW(0))310,310,91
C
C     SUBROUTINE GRID2 FOR GRID ENCLOSED BY WHOLE DEGREES
```

```
   32 CALL GRID2(ZZ,ZHT,NUMPL,DEGRA,FDEG2,RDEG2,RTØP,ITØP,RBØT,IBØT,
     1 RLEFT,ILEFT,RRIGT,IRIGT,SINCH,SMP,FBØT,FTØP,FLEFT,FRIGT,NDEG,
     2 SLAT,SLØNG,BØTMP)
C
C       CHECKING IF ØNLY DRAWING ØF GRID WANTED
C
        IF(ISW(0))310,310,91
C
C END ØF INITIALIZATIØN, BEGIN PLØTTING PØINTS
C
C  CHECKING IF TRACK PØINTS SHØULD BE CØNNECTED
   35  IF(ITRK)40,40,45
   40  IP = 3
       GØ TØ 70
   45  IF(INIT) 55,55,50
   50  IP = 3
       GØ TØ 70
   55  IF(IGAP) 65,65,60
   60  IP = 3
       GØ TØ 70
   65  IP = 2
C  PLØT DATA PØINT
   70  SLAT = RLAT
       SLØNG = RLØNG
      CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
       CALL PLØT(XX,YY,IP)
       IPCT=IPCT+1
       IF(ISW(16))876,876,710
  710  CALL ANØV3(XX,YY,DATAZ,DATAW)
       GØ TØ 72
C       CHECK FØR TYPE ØF DATA PØINT ANNØTATIØN MADE IN SPØT2
  876  CØNTINUE
   73  CALL SPØT2(XX,YY)
      IF(ISW(18).EQ.5) GØ TØ 72
C  DATA PØINT PLØTTED
   74  DATA=DATAX
       IF(NX)71,72,71
   71  MSTØP=MSTØP - NWØN
       IF(MSTØP)871,871,72
  871 CØNTINUE
C
C      TEST FØR TIME INTERVAL ANNØTATIØN
C
      IF(ISW(71)) 872,878,872
  872 IF(JDA-JØDA)875,873,875
  873 IF(FLØAT(JHM/100)-FLØAT(JØHM/100)) 874,72,874
  874 ITCT=ITCT+1
      IF(ITCT.LT.ISW(71)) GØ TØ 72
  875 ITCT=0
  878 CØNTINUE
       CALL ANØVG(ZZ,ZHT,NX,JDA,JMØ,JYR,JHM,JØDA,XX,YY,INIT,DATA,IDEC)
       MSTØP=NPTA
   72  INIT = 0
       RLTØ = RLAT
       RLGØ = RLØNG
       JØDA=JDA
       JØMØ=JMØ
       JØYR=JYR
       JØHM=JHM
         NPTS=NPTS+1
```

```
 310    CØNTINUE
C                   GSUM DATA
      IF(JFMT.EQ.3)
     *CALL GETGS(ITAPE,NX,DATAX,JFMT,RTØP,RBØT,RLEFT,RRIGT,
     1 RLAT,RLØNG,JDA,JMØ,JYR,JHM,IEØD,IBLK)
C                   GCØN DATA
      IF(JFMT.EQ.13)
     * CALL GETGC(ITAPE,NX,DATAX,NY,DATAY,NZ,DATAZ,
     *      RTØP,RBØT,RLEFT,RRIGT,RLAT,RLØNG,IEØD)
C                   GABS DATA
      IF(JFMT.EQ.14)
     * CALL GETGA(ITAPE,NX,DATAX,NY,DATAY,NZ,DATAZ,
     *      RTØP,RBØT,RLEFT,RRIGT,RLAT,RLØNG,IEØD)
  78    CØNTINUE
        IF  (IEØD-1) 85,1212,1212
1212    NFILE=NFILE-1
        IF(NFILE.LE.0) GØ TØ 12
        IEØD=0
        MFILE=MFILE+1
      ØUTPUT 'PLØTTING CØNTINUES FRØM NEXT FILE'
        GØ TØ 85
C
C END ØF DATA - CHECK SENSE SWITCHES FØR NEXT STEP
C
C CHECKING IF ANØTHER PLØT FØLLØWS ØR TØ EXIT
   12 IF(ISW(2).EQ.0.AND.ISW(13).EQ.0.AND.IBCKUP.EQ.0) GØ TØ 91
      IF(ISW(2).EQ.1) CALL PLØT(0.0,0.0,3)
C     SENSE SWITCH 13 CHECKS WHETHER ANØTHER PLØT IS TØ BE MADE FRØM SAME FILE.
      IF(ISW(13)) 80,81,80
   80 IBACK=0
      IF(IEØD.EQ.1) IBACK=1
       IF(MFILE.NE.0)    IBACK=MFILE+1
      CALL SKPFIL(ITAPE,IBACK,'REV')
C     SENSE SWITCH 14 CHECKS WHETHER ANØTHER INPUT TAPE IS TØ BE MØUNTED.
   81 IF (ISW(14)) 83,83,87
   87 WRITE(IIØUT,6496)
 6496 FØRMAT(/,CHANGE TØ NEXT INPUT TAPE,)
      CALL MCVØL(1)
C     SEQUENTIAL PLØTS FRØM SAME FILE WITH (IBCKUP) ØVERLAP
   83 IF(IBCKUP.EQ.0) GØ TØ 96
      IBCKUP=IBCKUP+1
      IF(IEØD.EQ.0) CALL SKPREC(ITAPE,IBCKUP,'REV')
      IF(IEØD.EQ.1) CALL SKPFIL(ITAPE,1,'REV')
C     ESTABLISH ØRIGIN ØF NEW PLØT
   96 IF (ISW(2).EQ.1) GØ TØ 95
      XINCRE=ABS(RDEG2)*RADEG*SINCH+4.00
      CALL PLØT(XINCRE,0.0,-3)
   95 IF(ISW(6).EQ.1) CALL PLØT(-1.00,-1.00,999); GØ TØ 94
C     PUT  RUN AND  DATA CARDS FØLLØWING LAST DATA DECK TØ REINITIALIZE PRØGRAM.
      GØ TØ 79
C  CLØSE PLØT TAPE AND END-ØF-JØB LABEL FØR PDP-5 ØPERATØR
      DATA (IEND(I),I=1,4) /'END ØF CHART JØB'/
   91 XINCRE=ABS(RDEG2)*RADEG*SINCH+1.00
C  CØMPLETE BØTTØM AND RIGHT SIDES ØF FIDUCIAL HALF-INCH SQUARE DRAWN IN GRID2
        CALL PLØT(XINCRE,-0.5,-3)
        CALL PLØT(0.5,0.0,-2)
        CALL PLØT(0.0,0.5,-2)
        CALL PLØT(2.5,-0.5,-3)
        CALL SYMBØL(0.0,0.0,0.42,IEND,90.0,16)
        CALL PLØT(4.0,0.0,999)
   94  IF(ISW(10).EQ.1) CALL MREL(1)
       WRITE(IIØUT,97)IPCT
   97  FØRMAT('  NUMBER PØINTS PLØTTED = ',I8)
       CALL EXIT
C     SKIPPING PØINTS, IF EVERY PØINT NØT TØ BE PLØTTED.
   85  IF(NSKIP) 186,186,185
  185  CALL SKPREC(ITAPE,NSKIP.
       GØ TØ (999,186,12,999,12,999)IND
 186   CØNTINUE
      IF(JFMT.EQ.13) GØ TØ 852
      IF(JFMT.EQ.14) GØ TØ 852
C  CHECK IF DATE IS WITHIN SPECIFIED INTERVAL
C     IFLAG IS A FLAG TØ ALLØW SKIPPING THE FIRST CALL TØ FIND
C      IF WE HAVE ALREADY  FØUND THE STARTING DATE
       IF(IFLAG.NE.0) GØ TØ 82
       CALL FIND(ISTDA,ISTMØ,ISTYR,ISTHM,JDA,JMØ,JYR,JHM,INDK)
       IF(INDK.EQ.-1) GØ TØ 310
       IFLAG=1
   82  CØNTINUE
       IF(IENYR.EQ.0) GØ TØ 851
       CALL FIND(IENDA,IENMØ,IENYR,IENHM,JDA,JMØ,JYR,JHM,INDK)
       IF(INDK.EQ.1) GØ TØ  995
  851  CØNTINUE
  852  CØNTINUE
C  CHECKING IF DATA WITHIN CHART BØUNDRIES
       NSTØP=LCNT
        IF(RTØP-RLAT) 100,100,86
   86  IF(RLAT-RBØT) 100,88,88
   88  IF(RLØNG-RLEFT) 100,90,90
   90  IF(RRIGT-RLØNG) 100,100,92
C  DATA WITHIN BØUNDS
   92  GØ TØ 35
C  DATA ØUTSIDE ØF BØUNDS
C  WRITING ØUT DATE IF DATA PØINT IS ØUT ØF BØUNDS
  100 INIT=1
       IF(ISW(9))410,310,410
  410  WRITE(IIØUT,420)JDA,JMØ,JYR,JHM
  420  FØRMAT(,ØØB ,,3I2,1X,I4)
      GØ TØ 310
 995   WRITE(IIØUT,996) JDA, JMØ, JYR, JHM
 996   FØRMAT(,END DATE PASSED,,2X,3I2,1X,I4)
      GØ TØ 12
C     ERRØR MESSAGES IF MISTAKE IN TAPE FILE ØR RECØRD SPACING.
 999   WRITE(IIØUT,998) IND
 998  FØRMAT(,ERRØR IN SKPREC, IND=,,I2)
      GØ TØ 91
  997 WRITE(IIØUT,994) IND
  994 FØRMAT(,ERRØR IN SKPFIL, IND=,,I2)
      CALL EXIT
       END
```

```
                                 HEX      DEC                                   HEX      DEC                                   HEX      DEC
NAME    TYPE CLASS               LØC     WØRDS    NAME    TYPE CLASS            LØC     WØRDS    NAME    TYPE CLASS            LØC     WØRDS
----    ---- -----            --------   -----    ----    ---- -----         --------   -----    ----    ---- -----         --------   -----
A          R SCALR            00457 C        1    ABS        R SPRØG         INTRIN              ALØG       R SPRØG         INTRIN
ANØVG        SPRØG            EXTERN              ANØV3        SPRØG         EXTERN              B          R SCALR         00458 C        1
BØTMP      R SCALR            00454 C        1    CØS        R SPRØG         INTRIN              DATA       R SCALR         0043B C        1
DATAW      R SCALR            0045B C        1    DATAX      R SCALR         0045C C        1    DATAY      R SCALR         00463 C        1
DATAZ      R SCALR            0045A C        1    DEGRA      R SCALR         00427 C        1    EXIT         SPRØG         EXTERN
FBØT       R SCALR            0044E C        1    FDEG2      R SCALR         00441 C        1    FIND         SPRØG         EXTERN
FLEFT      R SCALR            00450 C        1    FLØAT      R SPRØG         INTRIN              FRIGT      R SCALR         00451 C        1
FTØP       R SCALR            0044F C        1    GETGA        SPRØG         EXTERN              GETGC        SPRØG         EXTERN
GETGS        SPRØG            EXTERN              GRID2        SPRØG         EXTERN              I          I SCALR         00405 C        1
IAGAP      I SCALR            00419 C        1    IBACK      I SCALR         00468 C        1    IBCKUP     I SCALR         00425 C        1
IBLK       I SCALR            00005 V        1    IBØT       I SCALR         00446 C        1    IBUF       I ARRAY         00000 C     1000
ICTYP      I SCALR            00436 C        1    IDATA      I SCALR         0043A C        1    IDEC       I SCALR         00437 C        1
IDEG2      I SCALR            00440 C        1    IEND       I ARRAY         00000 V        4    IENDA      I SCALR         0041F C        1
IENHM      I SCALR            00422 C        1    IENMØ      I SCALR         00420 C        1    IENYR      I SCALR         00421 C        1
IEØD       I SCALR            00417 C        1    IFLAG      I SCALR         00404 C        1    IGAP       I SCALR         00418 C        1
IIN        I SCALR            00400 C        1    IIØUT      I SCALR         00401 C        1    ILEFT      I SCALR         00448 C        1
IND        I SCALR            00403 C        1    INDK       I SCALR         0046A C        1    INIT       I SCALR         0040D C        1
INZ        I SCALR            00409 C        1    IP         I SCALR         00459 C        1    IPCT       I SCALR         00004 V        1
IRIGT      I SCALR            0044A C        1    ISFIL      I SCALR         00424 C        1    ISKP       I SCALR         00423 C        1
ISTDA      I SCALR            00418 C        1    ISTHM      I SCALR         0041E C        1    ISTMØ      I SCALR         0041C C        1
ISTYR      I SCALR            0041D C        1    ISW        I SPRØG         EXTERN              ITAPE      I SCALR         0040A C        1
ITCT       I SCALR            00006 V        1    ITØP       I SCALR         00444 C        1    ITRK       I SCALR         00429 C        1
JDA        I SCALR            0045D C        1    JFMT       I SCALR         0042F C        1    JHM        I SCALR         00460 C        1
JMØ        I SCALR            0045E C        1    JØDA       I SCALR         00410 C        1    JØHM       I SCALR         00413 C        1
JØMØ       I SCALR            00411 C        1    JØYR       I SCALR         00412 C        1    JYR        I SCALR         0045F C        1
KDEG2      I SCALR            0043F C        1    KGDA       I SCALR         00464 C        1    KGHM       I SCALR         00467 C        1
KGMØ       I SCALR            00465 C        1    KGYR       I SCALR         00466 C        1    KHT        I SCALR         00435 C        1
KØGHM      I SCALR            0043E C        1    KPT        I SCALR         00434 C        1    LABELP     I ARRAY         003E8 C       20
LCNT       I SCALR            0042A C        1    MCVØL        SPRØG         EXTERN              MFILE      I SCALR         00402 C        1
MØUNT        SPRØG            EXTERN              MREL         SPRØG         EXTERN              MSTØP      I SCALR         00433 C        1
NAME       I SCALR            00408 C        1    NDEG       I SCALR         0042B C        1    NFILE      I SCALR         00430 C        1
NØW        I ARRAY            003FC C        4    NPTA       I SCALR         0042E C        1    NPTS       I SCALR         0041A C        1
NSKIP      I SCALR            00431 C        1    NSTØP      I SCALR         00432 C        1    NUMPL      I SCALR         0042C C        1
NW         I SCALR            00416 C        1    NWØN       I SCALR         00407 C        1    NX         I SCALR         0042D C        1
NY         I SCALR            00414 C        1    NZ         I SCALR         00415 C        1    NZERØ      I SCALR         00406 C        1
ØLINE        SPRØG            EXTERN              PLACE      R SCALR         0040C C        1    PLØT         SPRØG         EXTERN
PLØTS        SPRØG            EXTERN              RADEG      R SCALR         00426 C        1    RBØT       R SCALR         00445 C        1
RDEG2      R SCALR            00442 C        1    RETBY        SPRØG         EXTERN              RLAT       R SCALR         0043C C        1
RLEFT      R SCALR            00447 C        1    RLGØ       R SCALR         00462 C        1    RLØNG      R SCALR         0043D C        1
RLTØ       R SCALR            00461 C        1    RRIGT      R SCALR         00449 C        1    RTØP       R SCALR         00443 C        1
SETSKP       SPRØG            EXTERN              SIN        R SPRØG         INTRIN              SINCH      R SCALR         00428 C        1
SKPFIL       SPRØG            EXTERN              SKPREC       SPRØG         EXTERN              SLAT       R SCALR         00452 C        1
SLGK       R SCALR            0044C C        1    SLØNG      R SCALR         00453 C        1    SLTK       R SCALR         0044B C        1
SMP        R SCALR            0044D C        1    SPØT2        SPRØG         EXTERN              STAT         SPRØG         EXTERN
SYMBØL       SPRØG            EXTERN              TØDAY        SPRØG         EXTERN              VETBY        SPRØG         EXTERN
WHR          SPRØG            EXTERN              XINCRE     R SCALR         00469 C        1    XØLD       R SCALR         0040E C        1
XX         R SCALR            00455 C        1    YØLD       R SCALR         0040F C        1    YY         R SCALR         00435 C        1
ZERØ       R SCALR            00408 C        1    ZHT        R SCALR         00439 C        1    ZZ         R SCALR         00438 C        1


         HEX                 HEX                 HEX                 HEX                 HEX                 HEX
LABEL    LØC       LABEL     LØC       LABEL     LØC       LABEL     LØC       LABEL     LØC       LABEL     LØC
-----   -----      -----    -----      -----    -----      -----    -----      -----    -----      -----    -----
    2   000FA          3    0015B          4    001F1          5    000C3          6    00047          7    00057
    8   0014D         10    00024         11    0014B         12    003F0         13    [illegible]   20    002C4
   22   002C9         30    002C7         32    002FE         35    0031E         40    [illegible]   45    00323
   50  00325         55  00328         60  0032A         65  0032D         70  0032F         71  0035F
   72  0038E         73  00352         74  0035B         78  003D8         79  0002F         80  0040B
   81  0041C         82  004C6         83  00431         85  0049D         86  004DB         87  00421
   88  004DE         90  004E1         91  0045E         92  004E4         94  00484         95  00452
   96  00443         97  00491        100  004E5        185  0049F        186  004AE        205  00275
  210  00247        230  002A2        310  0039D        410  004EC        420  004F4        710  0034B
  851  004D6        852  004D6        871  00364        872  00369        873  0036C        874  00375
  875  0037B        876  00352        878  0037D        994  00520        995  004FB        996  00503
  997  0051B        998  00512        999  0050D       1212  003DB       5765  000B0       5784  000A6
 6364  00237       6365  00110       6493  001D2       6496  00425       6498  0016E       6499  001FC


LØCAL VARIABLES (7 WØRDS)!

   00000 IEND        00004 IPCT        00005 IBLK        00006 ITCT


BLANK CØMMØN (1131 WØRDS)!

   00000 IBUF        003E8 LABELP      003FC NØW         00400 IIN         00401 IIØUT       00402 MFILE
   00403 IND         00404 IFLAG       00405 I           00406 NZERØ       00407 NWØN        00408 ZERØ
   00409 INZ         0040A ITAPE       0040B NAME        0040C PLACE       0040D INIT        0040E XØLD
   0040F YØLD        00410 JØDA        00411 JØMØ        00412 JØYR        00413 JØHM        00414 NY
   00415 NZ          00416 NW          00417 IEØD        00418 IGAP        00419 IAGAP       0041A NPTS
   0041B ISTDA       0041C ISTMØ       0041D ISTYR       0041E ISTHM       0041F IENDA       00420 IENMØ
   00421 IENYR       00422 IENHM       00423 ISKP        00424 ISFIL       00425 IBCKUP      00426 RADEG
   00427 DEGRA       00428 SINCH       00429 ITRK        0042A LCNT        0042B NDEG        0042C NUMPL
   0042D NX          0042E NPTA        0042F JFMT        00430 NFILE       00431 NSKIP       00432 NSTØP
   00433 MSTØP       00434 KPT         00435 KHT         00436 ICTYP       00437 IDEC        00438 ZZ
   00439 ZHT         0043A IDATA       0043B DATA        0043C RLAT        0043D RLØNG       0043E KØGHM
   0043F KDEG2       00440 IDEG2       00441 FDEG2       00442 RDEG2       00443 RTØP        00444 ITØP
   00445 RBØT        00446 IBØT        00447 RLEFT       00448 ILEFT       00449 RRIGT       0044A IRIGT
   0044B SLTK        0044C SLGK        0044D SMP         0044E FBØT        0044F FTØP        00450 FLEFT
   00451 FRIGT       00452 SLAT        00453 SLØNG       00454 RØTMP       00455 XX          00456 YY
   00457 A           00458 B           00459 IP          0045A DATAZ       0045B DATAW       0045C DATAX
   0045D JDA         0045E JMØ         0045F JYR         00460 JHM         00461 RLTØ        00462 RLGØ
   00463 DATAY       00464 KGDA        00465 KGMØ        00466 KGYR        00467 KGHM        00468 IBACK
   00469 XINCRE      0046A INDK


INTRINSIC SUBPRØGRAMS USED:

   ABS         ALØG        CØS         FLØAT       SIN


EXTERNAL SUBPRØGRAMS REQUIRED!

   ANØVG       ANØV3       EXIT        FIND        GETGA       GETGC       GETGS       GRID2
   ISW         MCVØL       MØUNT       MREL        ØLINE       PLØT        PLØTS       RETBY
   SETSKP      SKPFIL      SKPREC      SPØT2       STAT        SYMBØL      TØDAY       VETBY
   WWR         F:101       F:102       F:103       F:104       F:105       F:106       F:108
   M:D9        M:ØC        9ALØG       9BCDRDEE    9BCDREAD    9BCDWRIT    9CØS        9ENDIØL
   9INITIAL    9IØDATA     9IØLUSA     9ITØR       9PRINT      9SIN        9STØP
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC         HEX
                     WØRDS       WØRDS
                     -----       -----
  GENERATED CØDE:     1324       0052C    (NØ MEMØRY PRØTECTIØN)
       CØNSTANTS:       44       0002C
 LØCAL VARIABLES:        7       00007
           TEMPS:        3       00003
                     -----       -----
   TØTAL PRØGRAM:     1378       00562    (PLUS BLANK CØMMØN)
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```
    1 FØRMAT(1X,'PRØGRAM CØNV67 VERSIØN 17 JAN 74')
C       PRØGRAM CØNV67
C     VERSIØN 17 JAN 74 TØ SPEED THINGS UP BY DECØDING FEWER ITEMS
C     PRØGRAM TØ CONVERT TØ 1967 GRAVITY SYSTEM
C         AND NEW GEØDETIC REFERENCE
C     ØRIGINAL VERSIØN 1 DEC 73 BY LEE GØVE
      DIMENSIØN IBUFIN(32,50,2), IBUFØT(32,50,2)
      DIMENSIØN IA(35)
      WRITE (108,1)
      IREC2=2
      ITAPE=1
      JTAPE=2
      KTAPE=108
      IFLIP=1
      JFLIP=1
      KFLIP=1
      NFLIP=1
      ICNT=0
      NIN=50
      NØUT=0
      IØUTSW=0
      DEGRA=1.745329E-2
      KI=1;KØ=-2
C
C     BUFFER LØGIC FØR I/P
C
      CALL BUFF IN(ITAPE,0,IBUFIN(1,1,IFLIP),1600)
   10 CØNTINUE
      IF(NIN.LT.50) GØ TØ 90
   15 CØNTINUE
      CALL ICHECK(ITAPE,IKEY,NI)
      GØ TØ (20,50,30,40) IKEY
   20 ØUTPUT 'WAITING FØR I/P'; IEØD=0
      GØ TØ 15
   30 ØUTPUT 'END ØF FILE ØN ITAPE';IEØD=1
      GØ TØ 50
   40 ØUTPUT 'NUFFER IN ERRØR';IEØD=1
      GØ TØ 999
   50 CØNTINUE
      NIN=0
      NFLIP=IFLIP
      IFLIP=3-IFLIP
      IF(IEØD.NE.1) CALL BUFF IN(ITAPE,0,IBUFIN(1,1,IFLIP),1600)
C
C     INPUT LØGIC
C
   90 CØNTINUE
      NIN=NIN+1
      IF (NI.EQ.1600) GØ TØ 95
C     GØING TØ EØF PRØCESSING
      NINCHK=NIN*32
      IF(NINCHK.GT.NI) GØ TØ 999
   95 CØNTINUE
       DECØDE(72,1001,IBUFIN(1,NIN,NFLIP),ND)  IREC1,ISØRC,KGDA,KGMØ,
     1     KGYR,KGHM,DLAT,DLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,TC,IELC
C
C     EDIT LØGIC
C
C
```

```
C         CONVERSION OF 1930 INTERNATIONAL GRAVITY FORMULA TO THAT OF
C              THE 1967 INTERNATIONAL GRAVITY FORMULA
C                     AND NEW GEODETIC REFERENCE SYSTEM
C
      CALL OBG(K977,OBSG,GOBS,KI)
      GOBS=GOBS-14.0
      CALL OBG(K977,OBSG,GOBS,KO)
      RLAT=DLAT*DEGRA
      DG=3.2-(13.6*(SIN(ABS(RLAT))**2))
      IF (FA.LT.990.) FA=FA+DG
      IF (BG.LT.990.) BG=BG+DG
  100 CONTINUE
C
C     OUTPUT LOGIC
C
  300 CONTINUE
      NOUT=NOUT+1
      DO 301 I=19,32,1
      IBUFOT(I,NOUT,JFLIP)=IBUFIN(I,NIN,NFLIP)
  301 CONTINUE
        ENCODE(72,1001,IBUFOT(1,NOUT,JFLIP),ND)IREC2,ISORC,KGDA,KGMO,
     1    KGYR,KGHM,DLAT,DLONG,ELEV,K977,OBSG,IDEP,FA,BG,TC,IELC
  305 CONTINUE
      IF(NOUT.LT.50) GO TO 10
C
C      BUFFER LOGIC FOR O/P
C
  310 CONTINUE
      IF(IOUTSW.NE.1) IOUTSW=1; GO TO 350
      JKEY=ICHECK(JTAPE)
      GO TO (320,350,330,340) JKEY
  320 OUTPUT 'WAITING FOR O/P' ; IEOD=0
      GO TO 310
  330 OUTPUT'END OF FILE JTAPE'  ;IEOD=1
      GO TO 999
  340 OUTPUT 'BUFF OUT ERROR' ; IEOD=1
      GO TO 999
  350 CONTINUE
      NOUT=0
      KFLIP=JFLIP
      JFLIP=3-JFLIP
      CALL  BUFF OUT(JTAPE,0,IBUFOT(1,1,KFLIP),1600)
      GO TO 10
C
C     END OF JOB
C
  999 CONTINUE
  910 CONTINUE
      JKEY=ICHECK(JTAPE)
      GO TO (920,950,930,940) JKEY
  920 OUTPUT 'WAITING FOR O/P' ; IEOD=0
      GO TO 910
  930 OUTPUT 'BAD JKEY' ; IEOD=1
      GO TO 960
  940 OUTPUT 'BUFF OUT ERROR' ; IEOD=1
      GO TO 960
  950 CONTINUE
      JWDS=NOUT*32
      CALL BUFF OUT(JTAPE,0,IBUFOT(1,1,JFLIP),JWDS)
  960 CONTINUE
```

```
        END FILE JTAPE
        OUTPUT 'ALL DONE'
C
C       FORMATS
C
     98 FORMAT(1X,32A4)
   1001 FORMAT(I1,I4,3I2,I4,2F9.4,F7.2,I3,F6.2,I5,2F6.1,F4.1,I2)
        END
```

```
                           HEX     DEC                                       HEX     DEC                                       HEX     DEC
NAME    TYPE CLASS         LOC     WORDS       NAME    TYPE CLASS            LOC     WORDS       NAME    TYPE CLASS            LOC     WORDS
----    ---- -----       -------   -----       ----    ---- -----          -------   -----       ----    ---- -----          -------   -----
ABS        R SPROG       INTRIN                BG         R SCALR          01944 V       1       BUFFIN       SPROG          EXTERN
BUFFOUT      SPROG       EXTERN                DEGRA      R SCALR          0192F V       1       DG         R SCALR          01949 V       1
DLAT       R SCALR       0193D V       1       DLONG      R SCALR          0193E V       1       ELEV       R SCALR          0193F V       1
FA         R SCALR       01943 V       1       GOBS       R SCALR          01947 V       1       I          I SCALR          0194A V       1
IA         I ARRAY       01900 V      35       IBUFIN     I ARRAY          00000 V    3200       IBUFOT     I ARRAY          00C80 V    3200
ICHECK     I SPROG       EXTERN                ICNT       I SCALR          0192B V       1       IDEP       I SCALR          01942 V       1
IELC       I SCALR       01946 V       1       IEOD       I SCALR          01934 V       1       IFLIP      I SCALR          01927 V       1
IKEY       I SCALR       01932 V       1       IOUTSW     I SCALR          0192E V       1       IREC1      I SCALR          01937 V       1
IREC2      I SCALR       01923 V       1       ISORC      I SCALR          01938 V       1       ITAPE      I SCALR          01924 V       1
JFLIP      I SCALR       01928 V       1       JKEY       I SCALR          0194B V       1       JTAPE      I SCALR          01925 V       1
JWDS       I SCALR       0194C V       1       KFLIP      I SCALR          01929 V       1       KGDA       I SCALR          01939 V       1
KGHM       I SCALR       0193C V       1       KGMO       I SCALR          0193A V       1       KGYR       I SCALR          0193B V       1
KI         I SCALR       01930 V       1       KO         I SCALR          01931 V       1       KTAPE      I SCALR          01926 V       1
K977       I SCALR       01940 V       1       ND         I SCALR          01936 V       1       NFLIP      I SCALR          0192A V       1
NI         I SCALR       01933 V       1       NIN        I SCALR          0192C V       1       NINCHK     I SCALR          01935 V       1
NOUT       I SCALR       0192D V       1       OBG          SPROG          EXTERN                OBSG       R SCALR          01941 V       1
RLAT       R SCALR       01948 V       1       SIN        R SPROG          INTRIN                TC         R SCALR          01945 V       1


          HEX                HEX                HEX                HEX                HEX                HEX
LABEL     LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC
-----    -----     -----    -----     -----    -----     -----    -----     -----    -----     -----    -----
    1    00001        10    00037        15    0003A        20    00048        30    00054        40    00062
   50    0006E        90    00082        95    0008C        98    0018B       100    000CB       300    000CB
  301    000DB       305    000F7       310    000FA       320    0010D       330    00119       340    00126
  350    00132       910    00144       920    00151       930    0015D       940    00168       950    00174
  960    00181       999    00144      1001    0018F

LOCAL VARIABLES (6477 WORDS):

    00000 IBUFIN       00C80 IBUFOT       019C0 IA           01923 IREC2        01924 ITAPE        01925 JTAPE
    01926 KTAPE        01927 IFLIP        01928 JFLIP        01929 KFLIP        0192A NFLIP        0192B ICNT
    0192C NIN          0192D NOUT         0192E IOUTSW       0192F DEGRA        01930 KI           01931 KO
    01932 IKEY         01933 NI           01934 IEOD         01935 NINCHK       01936 ND           01937 IREC1
    01938 ISORC        01939 KGDA         0193A KGMO         0193B KGYR         0193C KGHM         0193D DLAT
    0193E DLONG        0193F ELEV         0194C K977         01941 OBSG         01942 IDEP         01943 FA
    01944 BG           01945 TC           01946 IELC         01947 GOBS         01948 RLAT         01949 DG
    0194A I            0194B JKEY         0194C JWDS

BLANK COMMON (0 WORDS)

INTRINSIC SUBPROGRAMS USED:

    ABS        SIN

EXTERNAL SUBPROGRAMS REQUIRED:

    BUFFIN     BUFFOUT    ICHECK     OBG        F:108      M:DO       M:OC       9DECODE
    9ENCODE    9ENDFILE   9ENDIOL    9INITIAL   9IODATA    9PRINT     9SIN       9STOP
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC       HEX
                    WØRDS     WØRDS
                    -----     -----
  GENERATED CØDE:    415      0019F
       CØNSTANTS:      7      00007
 LØCAL VARIABLES:   6477      0194D
           TEMPS:      1      00001
                    -----     -----
   TØTAL PRØGRAM:   6900      01AF4
```

```
C       PROGRAM CR2G
C          VERSION OF 20 MAR 1973, TO ADD INPUT OF ELEV AND G METER CODES
C               MODIFICATION BY C. BOWIN
        OUTPUT ' *** PGM CR2G OF 20 MAR 1973'
C                                                                        CR2G0010
C * MAY 72 -- BY S. ABBOT TO CORRECT OUTPUT LISTING, AND TO              CR2G0020
C          OUTPUT GSUM DATA WITH LAT AND LON IN DECIMAL DEGREES          CR2G0030
C          ALSO TO CLEAN UP THE COMMENTS AND SO ON                       CR2G0040
C *  MOD 18 JAN 71/  -S.ABBOT TO CORRECT                                 CR2G0050
C********** REWRITTEN IN A HOPEFUL MANNER BY J. WOLFE JUNE E 1969        CR2G0060
C                                                                        CR2G0070
C * INPUT                                                                CR2G0080
C                                                                        CR2G0090
C * JOB INITIALIZATION                                                   CR2G0100
C                                                                        CR2G0110
C    1)  GRAVITY METER TABLES -- 70 CARDS                                CR2G0120
C    2)  SENSE SWITCH CARD -- 80I1 (SSW(0) = CC 80)                      CR2G0130
C    3)  IGM(1), IGM(2), DRFTCO, LSRC      (2A4,2X,F10.5,I5)             CR2G0140
C        IGM   -- NUMBER AND/OR MODEL OF GRAVITY METER USED              CR2G0150
C          FOR INSTANCE -- L&R G-18                                      CR2G0160
C        DRFTCO -- DRIFT CORRECTION FOR GRAVITY METER -- F10.5           CR2G0170
C        LSRC  -- SOURCE CODE FOR GSUM OUTPUT DATA                       CR2G0180
C * NOTE:  IF DRFTCO = 0.0, THE ASSUMED VALUE FOR THE GRAVITY METER      CR2G0190
C          DRIFT (ASDFT) WILL BE USED, UNLESS SSW(5) IS ON               CR2G0200
C * NOTE:  IF IGM(1) AND IGM(2) ARE BOTH BLANK, THE GRAVITY METER TYPE   CR2G0210
C          WILL BE SET TO THE DEFAULT TYPE OF 'L&R G-18'                 CR2G0220
C * NOTE:  IF LSRC = 0, THE SOURCE CODE WILL BE SET TO THE DEFAULT       CR2G0230
C          VALUE  -- LSRCD                                               CR2G0240
C                                                                        CR2G0250
C * THESE ARE FOLLOWED BY GROUPS OF INDIVIDUAL STATION COUNTER           CR2G0260
C   READING CARDS.  EACH GROUP IS HEADED BY 3 CARDS:                     CR2G0270
C   1)  THE ABSOLUTE GRAVITY VALUE FOR THE REFERENCE STATION --          CR2G0280
C       F3.0,F6.2 -- BASEG(1), BASEG(2)                                  CR2G0290
C   2)  THE CRUSTAL DENSITY IN GM PER CU CM  TO BE USED IN               CR2G0300
C       THE CALCULATION OF THE BOUGUER ANOMALY -- F4.2 -- DENSE          CR2G0310
C   3)  THE COUNTER READING CARD FOR THE REFERENCE STATION               CR2G0320
C                                                                        CR2G0330
C
C          FORMAT FOR COUNTER READING DATA IS THAT OF 17 MAY 1966
C
C * THESE ARE FOLLOWED BY COUNTER READING CARDS FOR THE REST OF THE      CR2G0340
C       MEASUREMENTS THAT ARE TO BE TIED TO THE REFERENCE MEASUREMENT.   CR2G0350
C                                                                        CR2G0360
C * A COUNTER READING CARD WITH ALL ZEROS EXCEPT FOR THE                 CR2G0370
C       YEAR VALUE (CC 9,10) WILL CAUSE THE PGM TO BRANCH TO READ        CR2G0380
C         NEW CARDS FOR BASEG AND DENSE AND THE REF STATION              CR2G0390
C   A CARD WITH ALL ZEROS INCLUDING YEAR WILL GO TO E.O.J                 CR2G0400
C   DO NOT HAVE AN ALL.ZEROS CARD FOLLOWING A CARD WITH ONLY THE YEAR.   CR2G0410
C                                                                        CR2G0420
C * SENSE SWITCH OPTIONS                                                 CR2G0430
C                                                                        CR2G0440
C   SSW(1) OFF, FOR PRINTED OUTPUT OF COMPUTED VALUES FOR EACH STATION    CR2G0450
C           ON, FOR SUPPRESSION OF PRINTED OUTPUT                        CR2G0460
C   SSW(2) OFF, TO PUNCH OUTPUT FOR INPUT TO GRAVITY DESCR. PGM. 'GDS'   CR2G0470
C           ON, TO SUPPRESS PUNCHED OUTPUT                               CR2G0480
C   SSW(4) OFF, TO OUTPUT GSUM FORMATTED DATA TO 'KTAPE'                 CR2G0490
C           ON, TO SUPPRESS GSUM FORMAT OUTPUT                           CR2G0500
C   SSW(5) OFF, FOR GRAVITY METER DRIFT CORRECTION                       CR2G0510
C           ON, FOR SUPPRESSION OF DRIFT CORRECTION                      CR2G0520
```

```
C                                                                         CR2G0530
C                                                                         CR2G0540
C * VARIABLE DEFINITIONS                                                   CR2G0550
C                                                                         CR2G0560
C   LDAY, MO, LYR,LTIME = DATE AND TIME OF READING  --  IF LOCAL TIME     CR2G0570
C        IS USED, KTZ SHOULD ALSO BE ENTERED.  IF GMT, KTZ ALWAYS = 0     CR2G0580
C        THIS IS THE TIME AS READ FROM THE COUNTER READING RECORDS.       CR2G0590
C   KGDA,KGMO,KGYR,KGHM  = DATE AND TIME OF READING  -- IN GMT  (OR       CR2G0600
C        LOCAL IF KTZ = 99)                                               CR2G0610
C   IDA1,IMO1,IYR1,ITM1  = DATE AND TIME OF REFERENCE STATION             CR2G0620
C        READING (IN GMT  (OR LOCAL IF KTZ = 99))                         CR2G0630
C   CRN   = GRAVITY METER COUNTER READING (IN UNITS)                      CR2G0640
C   ELEV  = ELEVATION OF GRAVITY METER ( IN METERS)                       CR2G0650
C   KTZ   = THE TIME ZONE CORRECTION.  IF KTZ = 99, IT INDICATES          CR2G0660
C        THAT KTZ WAS NOT AVAILABLE.  THUS  CLS AND HONK = 0.0            CR2G0670
C        DATE/TIME MAY BE ENTERED AS GMT, IN WHICH CASE KTZ               CR2G0680
C        WILL ALWAYS BE EQUAL TO ZERO.                                    CR2G0690
C        IF TIME OF READING IS IN LOCAL TIME BUT TIME ZONE IS NOT         CR2G0700
C        KNOWN, KTZ MAY BE ENTERED AS 99, IN WHICH CASE A TIME            CR2G0710
C        ZONE CORRECTION WILL NOT BE MADE AND HONK AND CLS WILL           CR2G0720
C        NOT BE CALCULATED.                                               CR2G0730
C * NOTE:  LOCAL + KTZ = GMT; I.E.  VALUES WEST OF GREENWICH ARE PLUS.    CR2G0740
C   DESC  = DESCRIPTION OF GRAVITY STATION SITE IN ALPHA-NUM FORMAT       CR2G0750
C                                                                         CR2G0760
C   DRFTCO = THE CORRECTION FACTOR FOR DRIFT OF THE GRAVITY METER.        CR2G0770
C      IF DRFTCO = 0.0 WE ASSUME A DRIFT RATE OF .003 MGALS/DAY           CR2G0780
C      IF ISW(5) EGUALS 1 PROGRAM DOES 'NOT' MAKE DRIFT CORRECTION        CR2G0790
C   ASDFT = ASSUMED DRIFT FOR GRAVITY METER                               CR2G0800
C * NOTE:  IF THE GRAVITY METER DRIFT IS NEGATIVE,                        CR2G0810
C          THE CORRECTION FOR DRIFT IS A POSITIVE NUMBER.                 CR2G0820
C   BASEG = TOTAL FIELD GRAVITY VALUE AT STATION OF REFERENCE             CR2G0830
C       THE VALUE IS READ IN WITH A FORMAT OF F3.0,F6.2 FROM              CR2G0840
C       WHICH IBASE FOR OUTPUT AND BASG7 FOR COMPUTATION IS FORMED.       CR2G0850
C       GOBS7 HAS 977000. SUBTRACTED FROM IT ... FOR OUTPUT, CONVERT      CR2G0860
C       TO I3,F6.2 AFTER ADDING 977000.                                   CR2G0870
C   LSRCD = DEFAULT SOURCE CODE FOR GSUM OUTPUT DATA                      CR2G0880
C   DLAT, DLON = LATITUDE AND LONGITUDE IN DECIMAL DEGREES                CR2G0890
C * NOTE:  LOCATIONS NORTH AND EAST ARE CONSIDERED AS POSITIVE;           CR2G0900
C          SOUTH AND WEST ARE CONSIDERED NEGATIVE.  (THIS IS THE          CR2G0910
C          EXACT OPPOSITE OF THE TIME ZONE CONVENTION)                    CR2G0920
C   JTAPE = UNIT REF. NO. FOR PUNCHED CARD OUTPUT  (SSW(2) OPTION)        CR2G0930
C   KTAPE = UNIT REF. NO. FOR GSUM FORMAT OUTPUT  (SSW(4) OPTION)         CR2G0940
C   IPCS  = PUNCH CARD SKIP(THIS IS DONE FOR THE GRAVITY DESCRIPTION      CR2G0950
C        PUNCHED CARD)                                                    CR2G0960
C   VALM  = GRAVITY METER CALIBRATION TABLES ARRAY                        CR2G0970
C        THIS IS THE TABLE USED TO 'LOOK-UP' OR CONVERT A GRAVITY METER CR2G0980
C        COUNTER READING TO AN EQUIVALENT RELATIVE MILLIGAL VALUE.        CR2G0990
C        THE COUNTER READING IS READ WITH A FORMAT OF F8.3 ,  FOR         CR2G1000
C        INSTANCE   3572.256                                              CR2G1010
C        THE HIGH-ORDER TWO DIGITS -- IN THIS CASE '35' -- ARE USED       CR2G1020
C        AS THE ARRAY INDEX.   THE VALUE STORED IN VALM(35) IS THE        CR2G1030
C        EGUIVALENT MILLIGAL VALUE FOR A COUNTER READING OF 3500.000,     CR2G1040
C        SO WE INTERPOLATE A VALUE BETWEEN VALM(35) AND VALM(36) AND      CR2G1050
C        ARRIVE AT A RELATIVE MILLIGAL VALUE FOR 3572.256                 CR2G1060
C                                                                         CR2G1070
C                                                                         CR2G1080
C *********************                                                   CR2G1090
C *                                                                       CR2G1100
C * INITIALIZATION                                                        CR2G1110
C *                                                                       CR2G1120
```

```
C *******************                                               CR2G1130
C                                                                   CR2G1140
       DIMENSION KDATE(4)                                           CR2G1150
      DIMENSION VALM(70),BASEG(2),DESC(31),IGM(2)                   CR2G1160
      DOUBLE PRECISION DTD                                          CR2G1170
      DOUBLE PRECISION  DEC,RLAT,RAD,RLONG                          CR2G1180
       DATA  WEST,SOUTH/'W   ','S   '/                              CR2G1190
C                                                                   CR2G1200
C * ASSUMED VALUES FOR L&R G=18 METER                               CR2G1210
C                                                                   CR2G1220
       DATA IBLNK,ILR,IG18/'    ','L&R ','G=18'/                    CR2G1230
       LSRCD = 006                                                  CR2G1240
       ASDFT = .003                                                 CR2G1250
C                                                                   CR2G1260
C * GET DATE OF RUN                                                 CR2G1270
C                                                                   CR2G1280
       CALL  TODAY (KDATE)                                          CR2G1290
C                                                                   CR2G1300
      IIN=105                                                       CR2G1310
      IOUT=108                                                      CR2G1320
      JTAPE=106                                                     CR2G1330
       KTAPE = 2                                                    CR2G1340
      ICOUNT=0                                                      CR2G1350
       IPAGE = 0                                                    CR2G1360
C                                                                   CR2G1370
      IREC=1                                                        CR2G1380
       IDEP  = 0                                                    CR2G1390
       RFA   = 0.0                                                  CR2G1400
       IREGC = 0                                                    CR2G1410
      TCORR=99.9                                                    CR2G1420
      LELC=09
      LGC=01
      IFFC=3                                                        CR2G1450
      IFBC=0                                                        CR2G1460
C                                                                   CR2G1470
C * READ IN GRAVITY METER CALIBRATION TABLE                         CR2G1480
C                                                                   CR2G1490
       DO    210 K = 1,70                                           CR2G1500
       READ  (IIN,5150) J,TABLE                                     CR2G1510
      VALM(J)=TABLE                                                 CR2G1520
  210  CONTINUE                                                     CR2G1530
C                                                                   CR2G1540
C * INITIALIZE SENSE SWITCHES                                       CR2G1550
C                                                                   CR2G1560
       INN   = (ISW(-2))                                            CR2G1570
C                                                                   CR2G1580
C * READ GRAVITY METER TYPE, DRIFT VALUE, AND SOURCE CODE VALUE     CR2G1590
C * SET UP DRIFT CORRECTION VALUE                                   CR2G1600
C   IF VALUE FEAD RROM CARD IS 0, USE ASDFT UNLESS SSW(5) IS ON.    CR2G1610
C                                                                   CR2G1620
       READ  (IIN,5230) IGM(1),IGM(2),DRFTCO,LSRC,IELC,IGC          CR2G1630
      IF(DRFTCO.EQ.0.0) DRFTCO=ASDFT                                CR2G1640
      IF(ISW(5).EQ.1) DRFTCO=0.0                                    CR2G1650
       IF    (IGM(1).EQ.IBLNK.AND.IGM(2).EQ.IBLNK)                  CR2G1660
     1   IGM(1) = ILR; IGM(2) = IG18                                CR2G1670
       IF    (LSRC .EQ. 0)  LSRC = LSRCD                            CR2G1680
       IF(IELC.EQ.0) IELC=LELC
       IF(IGC.EQ.0)  IGC=LGC
C                                                                   CR2G1690
C * WRITE OUT JOB INITIALIZATION VALUES                             CR2G1700
```

```
C                                                                       CR2G1710
      WRITE (IØUT,5200) IPAGE,KDATE                                     CR2G1720
      WRITE (IØUT,5285) IGM(1),IGM(2),DRFTCØ,LSRC,IELC,IGC              CR2G1730
      DØ    294 II = 1,70                                               CR2G1740
      WRITE (IØUT,5290) II,VALM(II)                                     CR2G1750
  294 CØNTINUE                                                          CR2G1760
C                                                                       CR2G1770
C ********************                                                  CR2G1780
C *                                                                     CR2G1790
C * CØMPUTATIØN ØF ØBSERVED GRAVITY AND ANØMALIES                       CR2G1800
C *                                                                     CR2G1810
C * BEGIN A GRØUP ØF MEASUREMENTS                                       CR2G1820
C *                                                                     CR2G1830
C ********************                                                  CR2G1840
C                                                                       CR2G1850
C * READ BASE GRAVITY                                                   CR2G1860
C   AND CØNVERT INTØ UNITS CØMPATIBLE WITH BØTH SYSTEMS                 CR2G1870
C                                                                       CR2G1880
  300 CØNTINUE                                                          CR2G1890
      READ  (IIN,5320, END=910) BASEG(1),BASEG(2)                       CR2G1900
      READ  (IIN,5330, END=910) DENSE                                   CR2G1910
     BASG7=((BASEG(1)-977.)*1000.)+BASEG(2)                             CR2G1920
     IBASE=BASEG(1)                                                     CR2G1930
C                                                                       CR2G1940
C * READ CØUNTER READING CARDS FØR INDIVIDUAL STATIØNS                  CR2G1950
C   THE FIRST CARD READ IS THE ØNE FØR THE REFERENCE STATIØN            CR2G1960
C   DRIFT IS CØMPUTED FRØM DATE ØN THIS FIRST CARD.                     CR2G1970
C   ALL ØTHER READINGS ARE REFERENCED TØ THIS MEASUREMENT.              CR2G1980
C                                                                       CR2G1990
      DØ    890 I = 1,9000                                              CR2G2000
      READ  (IIN,5405, END=910)                                         CR2G2010
    1              LSTAT,LDAY,MØ,LYR,LTIME,CRN,LAT,RLATM,SØRN,LØNG,     CR2G2020
    1RLØM,WØRE,ELEV,KTZ  ,(DESC(IK),IK=1,31)                            CR2G2030
     IPCS=0                                                             CR2G2040
     CLS=.99                                                            CR2G2050
     HØNK=.99                                                           CR2G2060
     CR=CRN                                                             CR2G2070
     NCR=CRN                                                            CR2G2080
C                                                                       CR2G2090
C * CHECK TØ SEE IF HAVE NEW REFERENCE STATIØN ØR CALL EXIT             CR2G2100
C   (STMT #180 IS EXIT, #300 IS START ØF NEW GRØUP)                     CR2G2110
C                                                                       CR2G2120
     IF(NCR)500,500,420                                                 CR2G2130
  500 IF(LYR)415,180,415                                                CR2G2140
  415 I=1                                                               CR2G2150
      GØTØ  300                                                         CR2G2160
C                                                                       CR2G2170
C * SEARCH TABLES FØR GRAVITY VALUE CØRRESPØNDING TØ CØUNTER READING    CR2G2180
C                                                                       CR2G2190
  420 TUCR=CR*0.01                                                      CR2G2200
     LC=TUCR                                                            CR2G2210
     CI=LC                                                              CR2G2220
     CI=CI*100.                                                         CR2G2230
     C2=CR-CI                                                           CR2G2240
     RELM=VALM(LC)+(C2*.01*(VALM(LC+1)-VALM(LC)))                       CR2G2250
C                                                                       CR2G2260
C * CALCULATE LAT AND LØN IN RADIANS AND IN DECIMAL DEGREES             CR2G2270
C                                                                       CR2G2280
     RDEG=LAT                                                           CR2G2290
     DEC=RLATM*1.666666E -2                                             CR2G2300
```

```
      RLAT=RDEG+DEC                                                     CR2G2310
       DLAT  = RLAT                                                     CR2G2320
      RAD=RLAT*(1.7453293D-2)                                           CR2G2330
      RLAT=RAD                                                          CR2G2340
C                                                                       CP2G2350
      RDEG=LØNG                                                         CR2G2360
      DEC=RLØM*1.666666666D-2                                           CR2G2370
      RLØNG=RDEG + DEC                                                  CR2G2380
       DLØN  = RLØNG                                                    CR2G2390
      RLØNG=RLØNG*1.7453293  D-2                                        CR2G2400
C                                                                       CR2G2410
C * IF KTZ IS EQUAL TØ 99 MEANS HAVE NØT MADE ØR LØØKED UP THE          CR2G2420
C     TIME ZØNE CØRRECTIØN. THERE THE FØLLØWING CALCULATIØNS            CR2G2430
C     ARE NØT NEEDED BECAUSE WE CANNØT CALCULATE THE TIDAL ØR           CR2G2440
C     HØNKLE CØRRECTIØNS WITHØUT IT                                     CR2G2450
C                                                                       CR2G2460
      IF(KTZ.NE.99)  GØ TØ 610                                          CR2G2470
      KGDA=LDAY                                                         CR2G2480
      KGMØ=MØ                                                           CR2G2490
      KGYR=LYR                                                          CR2G2500
      KGHM=LTIME                                                        CR2G2510
      ID=0                                                              CR2G2520
       GØTØ  630                                                        CR2G2530
C                                                                       CR2G2540
  610  CØNTINUE                                                         CR2G2550
      KTT=-KTZ                                                          CR2G2560
      CALL CHGMT(LDAY,MØ,LYR,LTIME,KTT,KGDA,KGMØ,KGYR,KGHM,NTZ)         CR2G2570
      CALL M2DY(KGYR,KGMØ,KGDA,ID)                                      CR2G2580
       ADAY  = KGHM                                                     CR2G2590
       ADAY  = ADAY / 2400.                                             CR2G2600
       ADAY  = ADAY + FLØAT (ID)                                        CR2G2610
C                                                                       CR2G2620
C   NØRTH LAT ØR EAST LØN IS PØSITIVE                                   CR2G2630
C   SØUTH LAT ØR WEST LØN IS NEGATIVE                                   CR2G2640
C                                                                       CR2G2650
        IF    (RLAT)  620,619,620                                       CR2G2660
  619   IF    (RLØNG) 620,630,620                                       CR2G2670
  620   CØNTINUE                                                        CR2G2680
C                                                                       CR2G2690
      IF(SØRN.EQ.SØUTH)  RLAT=-RLAT$ DLAT=-DLAT                         CR2G2700
      IF(WØRE.EQ.WEST)  RLØNG=-RLØNG$ DLØN=-DLØN                        CR2G2710
C                                                                       CR2G2720
C * CALCULATE CLS AND HØNK VALUES                                       CR2G2730
C                                                                       CR2G2740
      IHR=KGHM/100                                                      CR2G2750
      IMIN=KGHM-IHR*100                                                 CR2G2760
      CALL TIDAL(RLAT,RLØNG,KGYR,ID,IHR,IMIN,CLS,HØNK,DTD)              CR2G2770
      RELM=RELM+CLS+HØNK                                                CR2G2780
C                                                                       CR2G2790
  630  CØNTINUE                                                         CR2G2800
      IF(I-1)440,440,450                                                CR2G2810
C                                                                       CR2G2820
C * NEW REFERENCE STATIØN (= FIRST CARD ØF GRØUP) PRØCESSING            CR2G2830
C                                                                       CR2G2840
  440 REF=RELM                                                          CR2G2850
      IDA1=KGDA                                                         CR2G2860
      IMØ1=KGMØ                                                         CR2G2870
      IYR1=KGYR                                                         CR2G2880
      ITM1=KGHM                                                         CR2G2890
        LSTA=LSTAT                                                      CR2G2900
        IPCS=1                                                          CR2G2910
         LCNT = 0                                                       CR2G2920
         IPAGE = 1                                                      CR2G2930
C                                                                       CR2G2940
C * CALCULATE DRIFT                                                     CR2G2950
C                                                                       CR2G2960
  450 DIFFR=RELM-REF                                                    CR2G2970
        CALL CDATE(IDA1,IMØ1,IYR1,ITM1,KGDA,KGMØ,KGYR,KGHM,TIMD)        CR2G2980
        DRIFT=(TIMD/24.0)*DRFTCØ                                        CR2G2990
        GØBS7=BASG7+DIFFR-DRIFT                                         CR2G3000
        ICØUNT=ICØUNT+1                                                 CR2G3010
C                                                                       CR2G3020
C * PUT GØBS7 + 977000. INTØ ØUTPUT UNITS                               CR2G3030
C                                                                       CR2G3040
        ICØN=GØBS7/1000.                                                CR2G3050
        TEMP=ICØN*1000                                                  CR2G3060
        GØBS=GØBS7-TEMP                                                 CR2G3070
        IG=ICØN+977                                                     CR2G3080
C                                                                       CR2G3090
C * CØMPUTE FREE-AIR AND BØUGUER ANØMALIES                              CR2G3100
C                                                                       CR2G3110
        X=2.*RAD                                                        CR2G3120
        C2R=CØS(X)                                                      CR2G3130
        FELEV=((0.30855+0.00022*C2R)*ELEV)-(((ELEV*0.001)**2)*0.072)    CR2G3140
         RA1=RAD                                                        CR2G3150
         GFREE=GØBS7-GINTF(RA1)+FELEV
        BELEV=0.04185*DENSE*ELEV                                        CR2G3170
        GBØUG=GFREE-BELEV                                               CR2G3180
C                                                                       CR2G3190
C * CHECK TØ SEE IF LAT AND LØN = 0                                     CR2G3200
C   ØR IF ELEV = 0                                                      CR2G3210
C       IF THEY DØ SET GFREE AND GBØUG EQUAL TØ 999.0                   CR2G3220
C                                                                       CR2G3230
          IF(LAT)2050,2049,2050                                         CR2G3240
 2049   IF(RLATM)  2050,2051,2050                                       CR2G3250
 2051   IF(LØNG)  2050,2052,2050                                        CR2G3260
 2052    IF(RLØM)  2050,2053,2050                                       CR2G3270
C                                                                       CR2G3280
  2050  IF    (ELEV) 2054,2053,2054                                     CR2G3290
  2053 GFREE=999.0                                                      CR2G3300
        GBØUG=999.0                                                     CR2G3310
 2054    CØNTINUE                                                       CR2G3320
C                                                                       CR2G3330
        NSTATN=LSTAT                                                    CR2G3340
C                                                                       CR2G3350
C                                                                       CR2G3360
C * CØMPUTE GSUM SØRT KEY FIELDS                                        CR2G3370
C                                                                       CR2G3380
          PLAT  = DLAT + 90.                                            CR2G3390
          LTKEY = PLAT                                                  CR2G3400
          PLØN  = DLØN + 180.                                           CR2G3410
          LGKEY = PLØN                                                  CR2G3420
          IAKEY = 0                                                     CR2G3430
C                                                                       CR2G3440
C *******************                                                   CR2G3450
C *                                                                     CR2G3460
C * ØUTPUT THE DESIRED INFØRMATIØN                                      CR2G3470
C *                                                                     CR2G3480
C *******************                                                   CR2G3490
C                                                                       CR2G3500
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C * PUNCH ØUTPUT FØR INPUT TØ STATIØN DESCRIPTIØN PRØGRAM               CR2G3510
C   IPCS PREVENTS US FRØM PUNCHING THE REFERENCE STATIØN WHEN           CR2G3520
C        IT IS THE FIRST CARD ØUT                                       CR2G3530
C                                                                       CR2G3540
      IF    (IPCS.EQ.1)  GØTØ 835                                       CR2G3550
      IF    (ISW(2)) 835,825,835                                        CR2G3560
  825 WRITE (JTAPE,5825) LYR,MØ,LDAY,LTIME,LSTAT,IGM(1),IGM(2),         CR2G3570
     1  IG,GØBS,LSTA,IBASE,BASEG(2),RLAT,SØRN,RLØNG,WØRE,ELEV           CR2G3580
  835 CØNTINUE                                                          CR2G3590
C                                                                       CR2G3600
C * LISTING ØF CALCULATED VALUES                                        CR2G3610
C                                                                       CR2G3620
      IF    (ISW(1)) 869,851,869                                        CR2G3630
  851 IF    (LCNT) 852,852,860                                          CR2G3640
C                                                                       CR2G3650
C   PRINT PAGE HEADING                                                  CR2G3660
C                                                                       CR2G3670
  852 WRITE (IØUT,5001)                                                 CR2G3680
      IF    (IPAGE - 1) 853,853,854                                     CR2G3690
  853 WRITE (IØUT,5853)                                                 CR2G3700
  854 CØNTINUE                                                          CR2G3710
      WRITE (IØUT,5200) IPAGE,KDATE                                     CR2G3720
      WRITE (IØUT,5855) LSTA, IDA1,IMØ1,IYR1,ITM1,IGM(1),IGM(2),LSRC    CR2G3730
      WRITE (IØUT,5856) IBASE,BASEG(2), REF, DENSE, DRFTCØ              CR2G3740
      WRITE (IØUT,5858)                                                 CR2G3750
      IPAGE = IPAGE + 1                                                 CR2G3760
      LCNT  = 39                                                        CR2G3770
C                                                                       CR2G3780
  860 WRITE (IØUT,5860)                                                 CR2G3790
     1  LSTAT,LDAY,MØ,LYR,LTIME,KTZ,LAT,RLATM,SØRN,CR,                  CR2G3800
     2  GFREE,CLS ,DIFFR,DESC                                           CR2G3810
      WRITE (IØUT,5862)                                                 CR2G3820
     1  IG,GØBS,KGDA,KGMØ,KGYR,KGHM,ELEV,LØNG,RLØM,WØRE,RELM,           CR2G3830
     2  GBØUG,HØNK,DRIFT,TIMD,ADAY                                      CR2G3840
      LCNT  = LCNT - 3                                                  CR2G3850
  869 CØNTINUE                                                          CR2G3860
C                                                                       CR2G3870
C * ØUTPUT AT GSUM FØRMAT  TØ KTAPE                                     CR2G3880
C   FØRMAT FØRWARD CØDE = 3                                             CR2G3890
C                                                                       CR2G3900
      IF    (ISW(4)) 889,871,889                                        CR2G3910
  871 WRITE (KTAPE,5871) IREC,LSRC,KGDA,KGMØ,KGYR,KGHM,DLAT,DLØN,ELEV,  CR2G3920
     1  IG,GØBS,IDEP,GFREE,GBØUG,TCØRR,IELC,IGC,RFA,IREGC,              CR2G3930
     2  IFFC,CLS,HØNK,CRN,(DESC(II),II=1,16),NSTATN,IFBC,               CR2G3940
     3  LTKEY,LGKEY,IAKEY                                               CR2G3950
  889 CØNTINUE                                                          CR2G3960
C                                                                       CR2G3970
C * STMT. #890 IS THE END ØF THE READ DØ-LØØP                           CR2G3980
C                                                                       CR2G3990
  890 CØNTINUE                                                          CR2G4000
C                                                                       CR2G4010
C ******************                                                    CR2G4020
C *                                                                     CR2G4030
C * END ØF JØB                                                          CR2G4040
C *                                                                     CR2G4050
C ******************                                                    CR2G4060
C                                                                       CR2G4070
180   CØNTINUE                                                          CR2G4080
181   CØNTINUE                                                          CR2G4090
  910 CØNTINUE                                                          CR2G4100
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      WRITE (IØUT,5001)                                                 CR2G4110
      ØUTPUT ICØUNT                                                     CR2G4120
     IF(ISW(4).GT.0)  GØ TØ 24                                          CR2G4130
      ENDFILE KTAPE                                                     CR2G4140
 5950  WRITE (IØUT,5950)                                                CR2G4150
      REWIND KTAPE                                                      CR2G4160
 24   CØNTINUE                                                          CR2G4170
      IPAGE = 0                                                         CR2G4180
      WRITE (IØUT,5200) IPAGE,KDATE                                     CR2G4190
      STØP                                                              CR2G4200
C                                                                       CR2G4210
C ********************                                                  CR2G4220
C *                                                                     CR2G4230
C * FØRMATS                                                             CR2G4240
C *                                                                     CR2G4250
C ********************                                                  CR2G4260
C                                                                       CR2G4270
 5001  FØRMAT (1H1)                                                     CR2G4280
 5150  FØRMAT (I2,F7.2)                                                 CR2G4290
 5200  FØRMAT (T2'PAGE'I4,T35'DATE ØF RUN = '4A4)                       CR2G4300
 5230  FØRMAT (2A4,2X,F10.5,I5,I5,I5)
 5285  FØRMAT (' G-METER = '2A4'  DRFTCØ = 'F10.5,5X'SØURCE CØDE ='I4
     1     '     ELEV CØDE ='I4,5X'G METER CØDE ='I4)
 5290  FØRMAT (' TABLE: '5(I2,',',F7.2))                                CR2G4330
 5320  FØRMAT (F3.0,F6.2)                                               CR2G4340
 5330  FØRMAT (F4.2)                                                    CR2G4350
 5405  FØRMAT (I4,3I2,I4,F8.3,I2,F5.2,A1,I3,F5.2,A1,F7.1,I3,31A1)       CR2G4360
 5825  FØRMAT(3I2,I4,1X,I4,2A4,I3,F6.2,1X,I4,I3,F6.2,2(F9.6,A1),F7.1)   CR2G4370
 5855  FØRMAT (/'  REFERENCE STATIØN ='I5,10X'READING ØF '3(I2'/')I4,   CR2G4380
     1   5X,'METER = '2A4,5X'SØURCE CØDE ='I4)                          CR2G4390
 5853  FØRMAT (T2'*** NEW REFERENCE STATIØN ***'/                       CR2G4400
     1   T2'******************************' )                           CR2G4410
 5856  FØRMAT ('  REFERENCE GRAVITY = 'I3,F6.2,7X'REL MGAL = 'F11.3,    CR2G4420
     1   5X'DENSE =',F5.2,9X'DRFTCØ ='F6.4//)                           CR2G4430
 5858  FØRMAT (' STATIØN'10X'DATE'10X'TZ'4X'LATITUDE'2X'CTR RDNG'       CR2G4440
     1   4X'GFREE'3X'CLS' 5X'GDIFF'2X'DESCRIPTIØN'/                     CR2G4450
     2   ' ØBS GRAV'5X'GMT DATE'8X'ELEV'3X'LØNGITUDE'2X'REL MGAL'       CR2G4460
     3   4X'GBØUG'2X'HØNK'2X'ACUM DFT'7X'TDIFF'2X'DA-ØF-YR'/)           CR2G4470
 5860  FØRMAT (' ',I4,7X,3(I2'/')I4,6X,I3,2X,I3,1X,F5.2,A1,3X,          CR2G4480
     1   2(F7.2,2X),F4.2,1X,F9.3,2X,31A1)
 5862  FØRMAT (' ',I3,F6.2,2X,3(I2'/')I4,2X,F7.1,2X,I3,1X,F5.2,A1,3X,   CR2G4500
     1   2(F7.2,2X)F4.2,2X,F8.2,2X,F10.2,2X,F8.4,                       CR2G4510
     2   /)                                                             CR2G4520
 5871  FØRMAT (I1,I4,3I2,I4,2F9.4,F7.2,                                 CR2G4530
     1   I3,F6.2,I5,2F6.1,F4.1,2I2,F6.1,I1,                             CR2G4540
     2   I2,2F4.2,F7.2,16A1,I4,I2,                                      CR2G4550
     3   2I3,I2)                                                        CR2G4560
 5950 FØRMAT(' WRØTE END ØF FILE')                                      CR2G4570
C                                                                       CR2G4580
      END                                                               CR2G4590
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                    HEX    DEC                         HEX    DEC                         HEX    DEC
NAME   TYPE CLASS   LØC   WØRDS    NAME   TYPE CLASS   LØC   WØRDS    NAME   TYPE CLASS   LØC   WØRDS
----   ---- -----  ------- -----   ----   ---- -----  ------- -----   ----   ---- -----  ------- -----
ADAY      R SCALR  000BE V    1    ASDFT     R SCALR  0007E V    1    BASEG     R ARRAY  0004A V    2
BASG7     R SCALR  00098 V    1    BELEV     R SCALR  000D5 V    1    CDATE       SPRØG  EXTERN
CHGMT       SPRØG  EXTERN          CI        R SCALR  000B1 V    1    CLS       R SCALR  000AB V    1
CØS       R SPRØG  INTRIN          CR        R SCALR  000AD V    1    CRN       R SCALR  000A0 V    1
C2        R SCALR  000B2 V    1    C2R       R SCALR  000D1 V    1    DEC       D SCALR  00070 V    2
DENSE     R SCALR  00097 V    1    DESC      R ARRAY  0004C V   31    DIFFR     R SCALR  000C8 V    1
DLAT      R SCALR  000B5 V    1    DLØN      R SCALR  000B6 V    1    DRFTCØ    R SCALR  00092 V    1
DRIFT     R SCALR  000CA V    1    DTD       D SCALR  0006E V    2    ELEV      R SCALR  000A7 V    1
FELEV     R SCALR  000D2 V    1    FLØAT     R SPRØG  INTRIN          GBØUG     R SCALR  000D6 V    1
GFREE     R SCALR  000D4 V    1    GINTF     R SPRØG  EXTERN          GØBS      R SCALR  000CE V    1
GØBS7     R SCALR  000CB V    1    HØNK      R SCALR  000AC V    1    I         I SCALR  0009A V    1
IAKEY     I SCALR  000DC V    1    IBASE     I SCALR  00099 V    1    IBLNK     I SCALR  0007A V    1
ICØN      I SCALR  000CC V    1    ICØUNT    I SCALR  00083 V    1    ID        I SCALR  000BB V    1
IDA1      I SCALR  000C2 V    1    IDEP      I SCALR  00086 V    1    IELC      I SCALR  00094 V    1
IFBC      I SCALR  0008D V    1    IFFC      I SCALR  0008C V    1    IG        I SCALR  000CF V    1
IGC       I SCALR  00095 V    1    IGM       I ARRAY  0006B V    2    IG18      I SCALR  0007C V    1
IHR       I SCALR  000BF V    1    II        I SCALR  00096 V    1    IIN       I SCALR  0007F V    1
IK        I SCALR  000A9 V    1    ILR       I SCALR  0007B V    1    IMIN      I SCALR  000C0 V    1
IMØ1      I SCALR  000C3 V    1    INN       I SCALR  00091 V    1    IØUT      I SCALR  00080 V    1
IPAGE     I SCALR  00084 V    1    IPCS      I SCALR  000AA V    1    IREC      I SCALR  00085 V    1
IREGC     I SCALR  00088 V    1    ISW       I SPRØG  EXTERN          ITM1      I SCALR  000C5 V    1
IYR1      I SCALR  000C4 V    1    J         I SCALR  0008F V    1    JTAPE     I SCALR  00081 V    1
K         I SCALR  0008E V    1    KDATE     I ARRAY  00000 V    4    KGDA      I SCALR  000B7 V    1
KGHM      I SCALR  000BA V    1    KGMØ      I SCALR  000B8 V    1    KGYR      I SCALR  000B9 V    1
KTAPE     I SCALR  00082 V    1    KTT       I SCALR  000BC V    1    KTZ       I SCALR  000A8 V    1
LAT       I SCALR  000A1 V    1    LC        I SCALR  000B0 V    1    LCNT      I SCALR  000C7 V    1
LDAY      I SCALR  0009C V    1    LELC      I SCALR  0008A V    1    LGC       I SCALR  0008B V    1
LGKEY     I SCALR  000DB V    1    LØNG      I SCALR  000A4 V    1    LSRC      I SCALR  00093 V    1
LSRCD     I SCALR  0007D V    1    LSTA      I SCALR  000C6 V    1    LSTAT     I SCALR  0009B V    1
LTIME     I SCALR  0009F V    1    LTKEY     I SCALR  000D9 V    1    LYR       I SCALR  0009E V    1
MØ        I SCALR  0009D V    1    M2DY        SPRØG  EXTERN          NCR       I SCALR  000AE V    1
NSTATN    I SCALR  000D7 V    1    NTZ       I SCALR  000BD V    1    PLAT      R SCALR  000D8 V    1
PLØN      R SCALR  000DA V    1    RAD       D SCALR  00074 V    2    RA1       R SCALR  000D3 V    1
RDEG      R SCALR  000B4 V    1    REF       R SCALR  000C1 V    1    RELM      R SCALR  000B3 V    1
RFA       R SCALR  00087 V    1    RLAT      D SCALR  00072 V    2    RLATM     R SCALR  000A2 V    1
RLØM      R SCALR  000A5 V    1    RLØNG     D SCALR  00076 V    2    SØRN      R SCALR  000A3 V    1
SØUTH     R SCALR  00079 V    1    TABLE     R SCALR  00090 V    1    TCØRR     R SCALR  00089 V    1
TEMP      R SCALR  000CD V    1    TIDAL       SPRØG  EXTERN          TIMD      R SCALR  000C9 V    1
TØDAY       SPRØG  EXTERN          TUCR      R SCALR  000AF V    1    VALM      R ARRAY  00004 V   70
WEST      R SCALR  00078 V    1    WØRE      R SCALR  000A6 V    1    X         R SCALR  000D0 V    1

        HEX             HEX             HEX             HEX             HEX             HEX
LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC
-----  -----    -----  -----    -----  -----    -----  -----    -----  -----    -----  -----
   24  00289      180  0029F      181  0029F      210  0003F      294  0008F      300  00093
  415  000DC      420  000DF      440  00176      450  00188      500  000DA      595  00283
  610  00127      619  00148      620  0014A      630  00173      825  001F6      835  0020B
  851  00210      852  00212      853  00219      854  0021D      860  00241      869  0026A
  871  0026F      889  00298      890  0029B      910  0029F     2049  001D2     2050  001D8
 2051  001D4     2052  001D6     2053  001DA     2054  001DE     5001  002C5     5150  002C8
 5200  002CC     5230  002D6     5285  002DD     5290  002F6     5320  002FE     5330  00302
 5405  00305     5825  00313     5853  0033A     5855  00322     5856  0034D     5858  00365
 5860  00399     5862  003AE     5871  003C8     5950  003E0
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LØCAL VARIABLES (221 WØRDS):

   00000 KDATE      00004 VALM       0004A BASEG      0004C DESC       0006B IGM        0006E DTD
   00070 DEC        00072 RLAT       00074 RAD        00076 RLØNG      00078 WEST       00079 SØUTH
   0007A IBLNK      0007B ILR        0007C IG18       0007D LSRCD      0007E ASDFT      0007F IIN
   00080 IØUT       00081 JTAPE      00082 KTAPE      00083 ICØUNT     00084 IPAGE      00085 IREC
   00086 IDEP       00087 RFA        00088 IREGC      00089 TCØRR      0008A LELC       0008B LGC
   0008C IFFC       0008D IFBC       0008E K          0008F J          00090 TABLE      00091 INN
   00092 DRFTCØ     00093 LSRC       00094 IELC       00095 IGC        00096 II         00097 DENSE
   00098 BASG7      00099 IBASE      0009A I          0009B LSTAT      0009C LDAY       0009D MØ
   0009E LYR        0009F LTIME      000A0 CRN        000A1 LAT        000A2 RLATM      000A3 SØRN
   000A4 LØNG       000A5 RLØM       000A6 WØRE       000A7 ELEV       000A8 KTZ        000A9 IK
   000AA IPCS       000AB CLS        000AC HØNK       000AD CR         000AE NCR        000AF TUCR
   000B0 LC         000B1 CI         000B2 C2         000B3 RELM       000B4 RDEG       000B5 DLAT
   000B6 DLØN       000B7 KGDA       000B8 KGMØ       000B9 KGYR       000BA KGHM       000BB ID
   000BC KTT        000BD NTZ        000BE ADAY       000BF IHR        000C0 IMIN       000C1 REF
   000C2 IDA1       000C3 IMØ1       000C4 IYR1       000C5 ITM1       000C6 LSTA       000C7 LCNT
   000C8 DIFFR      000C9 TIMD       000CA DRIFT      000CB GØBS7      000CC ICØN       000CD TEMP
   000CE GØBS       000CF IG         000D0 X          000D1 C2R        000D2 FELEV      000D3 RA1
   000D4 GFREE      000D5 BELEV      000D6 GBØUG      000D7 NSTATN     000D8 PLAT       000D9 LTKEY
   000DA PLØN       000DB LGKEY      000DC IAKEY

BLANK CØMMØN (0 WØRDS)

INTRINSIC SUBPRØGRAMS USED:

   CØS        FLØAT

EXTERNAL SUBPRØGRAMS REQUIRED:

   CDATE      CHGMT      GINTF      ISW        M2DY       TIDAL      TØDAY      F:101
   F:102      F:103      F:104      F:105      F:106      F:108      M:DØ       M:ØC
   9BCDRDEE   9BCDREAD   9BCDWRIT   9CØS       9DTØR      9ENDFILE   9ENDIØL    9INITIAL
   9IØDATA    9IØLUSA    9ITØR      9PRINT     9REWIND    9RTØI      9STØP

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC      HEX
                    WØRDS    WØRDS
                    -----    -----
 GENERATED CØDE:    1001     003E9
      CØNSTANTS:      31     0001F
LØCAL VARIABLES:     221     000DD
          TEMPS:       1     00001
                    -----    -----
  TØTAL PRØGRAM:    1254     004E6
```

```
C      PROGRAM CR2G67
C       ORIGINAL VERSION 2 OCT 75
C      MOD OF CR2G TO CALCULATE IGSN 67 VALUES
C         VERSION OF 20 MAR 1973,  TO ADD INPUT OF ELEV AND G METER CODES
C              MODIFICATION BY C. BOWIN
        OUTPUT ' *** PGM CR2G OF 20 MAR 1973'
C                                                                       CR2G0010
C * MAY 72 -- BY S. ABBOT TO CORRECT OUTPUT LISTING, AND TO             CR2G0020
C         OUTPUT GSUM DATA WITH LAT AND LON IN DECIMAL DEGREES          CR2G0030
C         ALSO TO CLEAN UP THE COMMENTS AND SO ON                       CR2G0040
C *  MOD 18 JAN 71/  -S.ABBOT TO CORRECT                                CR2G0050
C********** REWRITTEN IN A HOPEFUL MANNER BY J. WOLFE JUNE E 1969       CR2G0060
C                                                                       CR2G0070
C * INPUT                                                               CR2G0080
C                                                                       CR2G0090
C * JOB INITIALIZATION                                                  CR2G0100
C                                                                       CR2G0110
C   1)  GRAVITY METER TABLES -- 70 CARDS                                CR2G0120
C   2)  SENSE SWITCH CARD -- 80I1 (SSW(0) = CC 80)                      CR2G0130
C   3)  IGM(1), IGM(2), DRFTCO, LSRC     (2A4,2X,F10.5,I5)              CR2G0140
C       IGM    -- NUMBER AND/OR MODEL OF GRAVITY METER USED             CR2G0150
C         FOR INSTANCE -- L&R G-18                                      CR2G0160
C       DRFTCO -- DRIFT CORRECTION FOR GRAVITY METER -- F10.5           CR2G0170
C       LSRC  -- SOURCE CODE FOR GSUM OUTPUT DATA                       CR2G0180
C * NOTE:  IF DRFTCO = 0.0, THE ASSUMED VALUE FOR THE GRAVITY METER     CR2G0190
C          DRIFT (ASDFT) WILL BE USED, UNLESS SSW(5) IS ON              CR2G0200
C * NOTE:  IF IGM(1) AND IGM(2) ARE BOTH BLANK, THE GRAVITY METER TYPE  CR2G0210
C          WILL BE SET TO THE DEFAULT TYPE OF 'L&R G-18'                CR2G0220
C * NOTE:  IF LSRC = 0, THE SOURCE CODE WILL BE SET TO THE DEFAULT      CR2G0230
C          VALUE  -- LSRCD                                              CR2G0240
C                                                                       CR2G0250
C * THESE ARE FOLLOWED BY GROUPS OF INDIVIDUAL STATION COUNTER          CR2G0260
C   READING CARDS.  EACH GROUP IS HEADED BY 3 CARDS:                    CR2G0270
C   1)  THE ABSOLUTE GRAVITY VALUE FOR THE REFERENCE STATION --         CR2G0280
C       F3.0,F6.2 -- BASEG(1), BASEG(2)                                 CR2G0290
C   2)  THE CRUSTAL DENSITY IN GM PER CU CM  TO BE USED IN              CR2G0300
C       THE CALCULATION OF THE BOUGUER ANOMALY -- F4.2 -- DENSE         CR2G0310
C   3)  THE COUNTER READING CARD FOR THE REFERENCE STATION              CR2G0320
C                                                                       CR2G0330
C
C         FORMAT FOR COUNTER READING DATA IS THAT OF 17 MAY 1966
C
C * THESE ARE FOLLOWED BY COUNTER READING CARDS FOR THE REST OF THE     CR2G0340
C       MEASUREMENTS THAT ARE TO BE TIED TO THE REFERENCE MEASUREMENT.  CR2G0350
C                                                                       CR2G0360
C * A COUNTER READING CARD WITH ALL ZEROS EXCEPT FOR THE                CR2G0370
C         YEAR VALUE (CC 9,10) WILL CAUSE THE PGM TO BRANCH TO READ     CR2G0380
C          NEW CARDS FOR BASEG AND DENSE AND THE REF STATION            CR2G0390
C   A CARD WITH ALL ZEROS INCLUDING YEAR WILL GO TO E.O.J               CR2G0400
C   DO NOT HAVE AN ALL-ZEROS CARD FOLLOWING A CARD WITH ONLY THE YEAR.  CR2G0410
C                                                                       CR2G0420
C * SENSE SWITCH OPTIONS                                                CR2G0430
C                                                                       CR2G0440
C   SSW(1) OFF, FOR PRINTED OUTPUT OF COMPUTED VALUES FOR EACH STATION  CR2G0450
C          ON, FOR SUPPRESSION OF PRINTED OUTPUT                        CR2G0460
C   SSW(2) OFF, TO PUNCH OUTPUT FOR INPUT TO GRAVITY DESCR. PGM. 'GDS'  CR2G0470
C          ON, TO SUPPRESS PUNCHED OUTPUT                               CR2G0480
C   SSW(4) OFF, TO OUTPUT GSUM FORMATTED DATA TO 'KTAPE'                CR2G0490
C          ON, TO SUPPRESS GSUM FORMAT OUTPUT                           CR2G0500
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C   SSW(5) OFF, FOR GRAVITY METER DRIFT CORRECTION                       CR2G0510
C          ON, FOR SUPPRESSION OF DRIFT CORRECTION                       CR2G0520
C                                                                        CR2G0530
C                                                                        CR2G0540
C * VARIABLE DEFINITIONS                                                 CR2G0550
C                                                                        CR2G0560
C   LDAY,  MO, LYR,LTIME = DATE AND TIME OF READING  --  IF LOCAL TIME   CR2G0570
C        IS USED, KTZ SHOULD ALSO BE ENTERED.  IF GMT, KTZ ALWAYS = 0    CR2G0580
C        THIS IS THE TIME AS READ FROM THE COUNTER READING RECORDS.      CR2G0590
C   KGDA,KGMO,KGYR,KGHM  = DATE AND TIME OF READING  -- IN GMT  (OR      CR2G0600
C        LOCAL IF KTZ = 99)                                              CR2G0610
C   IDA1,IMO1,IYR1,ITM1  = DATE AND TIME OF REFERENCE STATION            CR2G0620
C        READING (IN GMT  (OR LOCAL IF KTZ = 99))                        CR2G0630
C   CRN   = GRAVITY METER COUNTER READING (IN UNITS)                     CR2G0640
C   ELEV  = ELEVATION OF GRAVITY METER ( IN METERS)                      CR2G0650
C   KTZ   = THE TIME ZONE CORRECTION.  IF KTZ = 99, IT INDICATES         CR2G0660
C        THAT KTZ WAS NOT AVAILABLE.  THUS  CLS AND HONK = 0.0           CR2G0670
C        DATE/TIME MAY BE ENTERED AS GMT, IN WHICH CASE KTZ              CR2G0680
C        WILL ALWAYS BE EQUAL TO ZERO.                                   CR2G0690
C        IF TIME OF READING IS IN LOCAL TIME BUT TIME ZONE IS NOT        CR2G0700
C        KNOWN, KTZ MAY BE ENTERED AS 99, IN WHICH CASE A TIME           CR2G0710
C        ZONE CORRECTION WILL NOT BE MADE AND HONK AND CLS WILL          CR2G0720
C        NOT BE CALCULATED.                                              CR2G0730
C * NOTE;  LOCAL + KTZ = GMT; I.E.  VALUES WEST OF GREENWICH ARE PLUS.   CR2G0740
C   DESC  = DESCRIPTION OF GRAVITY STATION SITE IN ALPHA.NUM FORMAT      CR2G0750
C                                                                        CR2G0760
C   DRFTCO = THE CORRECTION FACTOR FOR DRIFT OF THE GRAVITY METER.       CR2G0770
C      IF DRFTCO = 0.0 WE ASSUME A DRIFT RATE OF .003 MGALS/DAY          CR2G0780
C      IF ISW(5) EQUALS 1 PROGRAM DOES 'NOT' MAKE DRIFT CORRECTION       CR2G0790
C   ASDFT = ASSUMED DRIFT FOR GRAVITY METER                              CR2G0800
C * NOTE:  IF THE GRAVITY METER DRIFT IS NEGATIVE,                       CR2G0810
C          THE CORRECTION FOR DRIFT IS A POSITIVE NUMBER.                CR2G0820
C   BASEG = TOTAL FIELD GRAVITY VALUE AT STATION OF REFERENCE            CR2G0830
C       THE VALUE IS READ IN WITH A FORMAT OF F3.0,F6.2 FROM             CR2G0840
C       WHICH IBASE FOR OUTPUT AND BASG7 FOR COMPUTATION IS FORMED.      CR2G0850
C       GOBS7 HAS 977000. SUBTRACTED FROM IT ... FOR OUTPUT, CONVERT     CR2G0860
C       TO I3,F6.2 AFTER ADDING 977000.                                  CR2G0870
C   LSRCD = DEFAULT SOURCE CODE FOR GSUM OUTPUT DATA                     CR2G0880
C   DLAT, DLON = LATITUDE AND LONGITUDE IN DECIMAL DEGREES               CR2G0890
C * NOTE:  LOCATIONS NORTH AND EAST ARE CONSIDERED AS POSITIVE;          CR2G0900
C          SOUTH AND WEST ARE CONSIDERED NEGATIVE.  (THIS IS THE         CR2G0910
C          EXACT OPPOSITE OF THE TIME ZONE CONVENTION)                   CR2G0920
C   JTAPE = UNIT REF. NO. FOR PUNCHED CARD OUTPUT  (SSW(2) OPTION)       CR2G0930
C   KTAPE = UNIT REF. NO. FOR GSUM FORMAT OUTPUT  (SSW(4) OPTION)        CR2G0940
C   IPCS  = PUNCH CARD SKIP(THIS IS DONE FOR THE GRAVITY DESCRIPTION     CR2G0950
C        PUNCHED CARD)                                                   CR2G0960
C   VALM  = GRAVITY METER CALIBRATION TABLES ARRAY                       CR2G0970
C        THIS IS THE TABLE USED TO 'LOOK-UP' OR CONVERT A GRAVITY METER  CR2G0980
C        COUNTER READING TO AN EQUIVALENT RELATIVE MILLIGAL VALUE.       CR2G0990
C        THE COUNTER READING IS READ WITH A FORMAT OF F8.3 ,  FOR        CR2G1000
C        INSTANCE   3572.256                                             CR2G1010
C        THE HIGH-ORDER TWO DIGITS -- IN THIS CASE '35' -- ARE USED      CR2G1020
C        AS THE ARRAY INDEX.  THE VALUE STORED IN VALM(35) IS THE        CR2G1030
C        EQUIVALENT MILLIGAL VALUE FOR A COUNTER READING OF 3500.000,    CR2G1040
C        SO WE INTERPOLATE A VALUE BETWEEN VALM(35) AND VALM(36) AND     CR2G1050
C        ARRIVE AT A RELATIVE MILLIGAL VALUE FOR 3572.256                CR2G1060
C                                                                        CR2G1070
C                                                                        CR2G1080
C *******************                                                    CR2G1090
C *                                                                      CR2G1100
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C * INITIALIZATION                                                       CR2G1110
C *                                                                      CR2G1120
C ********************                                                   CR2G1130
C                                                                        CR2G1140
       DIMENSION KDATE(4)                                                CR2G1150
      DIMENSION VALM(70),BASEG(2),DESC(31),IGM(2)                        CR2G1160
      DOUBLE PRECISION DTD                                               CR2G1170
      DOUBLE PRECISION  DEC,RLAT,RAD,RLONG                               CR2G1180
       DATA  WEST,SOUTH/'W   ','S   '/                                   CR2G1190
C                                                                        CR2G1200
C * ASSUMED VALUES FOR L&R G-18 METER                                    CR2G1210
C                                                                        CR2G1220
       DATA IBLNK,ILR,IG18/'    ','L&R ','G-18'/                         CR2G1230
      OUTPUT 'PROGRAM CR2G67 VERSION 2 OCT 75'
       LSRCD = 006                                                       CR2G1240
       ASDFT = .003                                                      CR2G1250
C                                                                        CR2G1260
C * GET DATE OF RUN                                                      CR2G1270
C                                                                        CR2G1280
       CALL  TODAY (KDATE)                                               CR2G1290
C                                                                        CR2G1300
      IIN=105                                                            CR2G1310
      IOUT=108                                                           CR2G1320
      JTAPE=106                                                          CR2G1330
       KTAPE = 2                                                         CR2G1340
      ICOUNT=0                                                           CR2G1350
       IPAGE = 0                                                         CR2G1360
C                                                                        CR2G1370
      IREC=1                                                             CR2G1380
       IDEP  = 0                                                         CR2G1390
       RFA   = 0.0                                                       CR2G1400
       IREGC = 0                                                         CR2G1410
      TCORR=99.9                                                         CR2G1420
      LELC=09
      LGC=01
      IFFC=3                                                             CR2G1450
      IFBC=0                                                             CR2G1460
C                                                                        CR2G1470
C * READ IN GRAVITY METER CALIBRATION TABLE                              CR2G1480
C                                                                        CR2G1490
       DO    210 K = 1,70                                                CR2G1500
       READ  (IIN,5150) J,TABLE                                          CR2G1510
      VALM(J)=TABLE                                                      CR2G1520
  210  CONTINUE                                                          CR2G1530
C                                                                        CR2G1540
C * INITIALIZE SENSE SWITCHES                                            CR2G1550
C                                                                        CR2G1560
       INN    = (ISW(-2))                                                CR2G1570
C                                                                        CR2G1580
C * READ GRAVITY METER TYPE, DRIFT VALUE, AND SOURCE CODE VALUE          CR2G1590
C * SET UP DRIFT CORRECTION VALUE                                        CR2G1600
C   IF VALUE FEAD RROM CARD IS 0, USE ASDFT UNLESS SSW(5) IS ON.         CR2G1610
C                                                                        CR2G1620
       READ  (IIN,5230) IGM(1),IGM(2),DRFTCO,LSRC,IELC,IGC               CR2G1630
      IF(DRFTCO.EQ.0.0) DRFTCO=ASDFT                                     CR2G1640
      IF(ISW(5).EQ.1) DRFTCO=0.0                                         CR2G1650
       IF    (IGM(1).EQ.IBLNK.AND.IGM(2).EQ.IBLNK)                       CR2G1660
     1   IGM(1) = ILR; IGM(2) = IG18                                     CR2G1670
       IF    (LSRC .EQ. 0)  LSRC = LSRCD                                 CR2G1680
       IF(IELC.EQ.0) IELC=LELC
      IF(IGC.EQ.0)  IGC=LGC
C                                                                       CR2G1690
C * WRITE ØUT JØB INITIALIZATIØN VALUES                                  CR2G1700
C                                                                       CR2G1710
      WRITE (IØUT,5200) IPAGE,KDATE                                     CR2G1720
      WRITE (IØUT,5285) IGM(1),IGM(2),DRFTCØ,LSRC,IELC,IGC              CR2G1730
      DØ    294 II = 1,70                                               CR2G1740
      WRITE (IØUT,5290) II,VALM(II)                                     CR2G1750
  294 CØNTINUE                                                          CR2G1760
C                                                                       CR2G1770
C *******************                                                   CR2G1780
C *                                                                     CR2G1790
C * CØMPUTATIØN ØF ØBSERVED GRAVITY AND ANØMALIES                       CR2G1800
C *                                                                     CR2G1810
C * BEGIN A GRØUP ØF MEASUREMENTS                                       CR2G1820
C *                                                                     CR2G1830
C *******************                                                   CR2G1840
C                                                                       CR2G1850
C * READ BASE GRAVITY                                                   CR2G1860
C   AND CØNVERT INTØ UNITS CØMPATIBLE WITH BØTH SYSTEMS                 CR2G1870
C                                                                       CR2G1880
  300 CØNTINUE                                                          CR2G1890
      READ  (IIN,5320, END=910) BASEG(1),BASEG(2)                       CR2G1900
      READ  (IIN,5330, END=910) DENSE                                   CR2G1910
     BASG7=((BASEG(1)-977.)*1000.)+BASEG(2)                             CR2G1920
      IBASE=BASEG(1)                                                    CR2G1930
C                                                                       CR2G1940
C * READ CØUNTER READING CARDS FØR INDIVIDUAL STATIØNS                  CR2G1950
C   THE FIRST CARD READ IS THE ØNE FØR THE REFERENCE STATIØN            CR2G1960
C   DRIFT IS CØMPUTED FRØM DATE ØN THIS FIRST CARD.                     CR2G1970
C   ALL ØTHER READINGS ARE REFERENCED TØ THIS MEASUREMENT.              CR2G1980
C                                                                       CR2G1990
      DØ    890 I = 1,9000                                              CR2G2000
      READ  (IIN,5405, END=910)                                         CR2G2010
     1              LSTAT,LDAY,MØ,LYR,LTIME,CRN,LAT,RLATM,SØRN,LØNG,    CR2G2020
     1RLØM,WØRE,ELEV,KTZ  ,(DESC(IK),IK=1,31)                           CR2G2030
      IPCS=0                                                            CR2G2040
      CLS=.99                                                           CR2G2050
      HØNK=.99                                                          CR2G2060
      CR=CRN                                                            CR2G2070
      NCR=CRN                                                           CR2G2080
C                                                                       CR2G2090
C * CHECK TØ SEE IF HAVE NEW REFERENCE STATIØN ØR CALL EXIT             CR2G2100
C   (STMT #180 IS EXIT; #300 IS START ØF NEW GRØUP)                     CR2G2110
C                                                                       CR2G2120
      IF(NCR)500,500,420                                                CR2G2130
  500 IF(LYR)415,180,415                                                CR2G2140
  415 I=1                                                               CR2G2150
      GØTØ  300                                                         CR2G2160
C                                                                       CR2G2170
C * SEARCH TABLES FØR GRAVITY VALUE CØRRESPØNDING TØ CØUNTER READING    CR2G2180
C                                                                       CR2G2190
  420 TUCR=CR*0.01                                                      CR2G2200
      LC=TUCR                                                           CR2G2210
      CI=LC                                                             CR2G2220
      CI=CI*100.                                                        CR2G2230
      C2=CR-CI                                                          CR2G2240
      RELM=VALM(LC)+(C2*.01*(VALM(LC+1)-VALM(LC)))                      CR2G2250
C                                                                       CR2G2260
C * CALCULATE LAT AND LØN IN RADIANS AND IN DECIMAL DEGREES             CR2G2270
```

```
C
      RDEG=LAT
      DEC=RLATM*1.666666E -2
      RLAT=RDEG+DEC
       DLAT  = RLAT
      RAD=RLAT*(1.7453293D-2)
      RLAT=RAD
C
      RDEG=LONG
      DEC=RLOM*1.666666666D-2
      RLONG=RDEG + DEC
       DLON  = RLONG
      RLONG=RLONG*1.7453293  D-2
C
C * IF KTZ IS EQUAL TO 99 MEANS HAVE NOT MADE OR LOOKED UP THE
C     TIME ZONE CORRECTION. THERE THE FOLLOWING CALCULATIONS
C     ARE NOT NEEDED BECAUSE WE CANNOT CALCULATE THE TIDAL OR
C     HONKLE CORRECTIONS WITHOUT IT
C
      IF(KTZ.NE.99)  GO TO 610
      KGDA=LDAY
      KGMO=MO
      KGYR=LYR
      KGHM=LTIME
      ID=0
       GOTO  630
C
  610  CONTINUE
      KTT=-KTZ
      CALL CHGMT(LDAY,MO,LYR,LTIME,KTT,KGDA,KGMO,KGYR,KGHM,NTZ)
      CALL M2DY(KGYR,KGMO,KGDA,ID)
       ADAY  = KGHM
       ADAY  = ADAY / 2400.
       ADAY  = ADAY + FLOAT (ID)
C
C   NORTH LAT OR EAST LON IS POSITIVE
C   SOUTH LAT OR WEST LON IS NEGATIVE
C
       IF    (RLAT)  620,619,620
  619  IF    (RLONG) 620,630,620
  620  CONTINUE
C
      IF(SORN.EQ.SOUTH)  RLAT=-RLAT; DLAT=-DLAT
      IF(WORE.EQ.WEST)  RLONG=-RLONG; DLON=-DLON
C
C * CALCULATE CLS AND HONK VALUES
C
      IHR=KGHM/100
      IMIN=KGHM-IHR*100
      CALL TIDAL(RLAT,RLONG,KGYR,ID,IHR,IMIN,CLS,HONK,DTD)
      RELM=RELM+CLS+HONK
C
  630  CONTINUE
      IF(I-1)440,440,450
C
C * NEW REFERENCE STATION (= FIRST CARD OF GROUP) PROCESSING
C
  440 REF=RELM
      IDA1=KGDA
      IMO1=KGMO
```

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          IYR1=KGYR                                                     CR2G2880
          ITM1=KGHM                                                     CR2G2890
            LSTA=LSTAT                                                  CR2G2900
          IPCS=1                                                        CR2G2910
           LCNT = 0                                                     CR2G2920
           IPAGE = 1                                                    CR2G2930
      C                                                                 CR2G2940
      C * CALCULATE DRIFT                                               CR2G2950
      C                                                                 CR2G2960
        450 DIFFR=RELM-REF                                              CR2G2970
          CALL CDATE(IDA1,IMO1,IYR1,ITM1,KGDA,KGMO,KGYR,KGHM,TIMD)      CR2G2980
          DRIFT=(TIMD/24.0)*DRFTCO                                      CR2G2990
          GOBS7=BASG7+DIFFR-DRIFT                                       CR2G3000
          ICOUNT=ICOUNT+1                                               CR2G3010
      C                                                                 CR2G3020
      C * PUT GOBS7 + 977000. INTO OUTPUT UNITS                         CR2G3030
      C                                                                 CR2G3040
          ICON=GOBS7/1000.                                              CR2G3050
          TEMP=ICON*1000                                                CR2G3060
          GOBS=GOBS7-TEMP                                               CR2G3070
          IG=ICON+977                                                   CR2G3080
      C                                                                 CR2G3090
      C * COMPUTE FREE-AIR AND BOUGUER ANOMALIES                        CR2G3100
      C                                                                 CR2G3110
          X=2.*RAD                                                      CR2G3120
          C2R=COS(X)                                                    CR2G3130
          FELEV=((0.30855+0.00022*C2R)*ELEV)-(((ELEV*0.001)**2)*0.072)  CR2G3140
           RA1=RAD                                                      CR2G3150
           GFREE=GOBS7-GI67F(RA1)+FELEV
          BELEV=0.04185*DENSE*ELEV                                      CR2G3170
          GBOUG=GFREE-BELEV                                             CR2G3180
      C                                                                 CR2G3190
      C * CHECK TO SEE IF LAT AND LON = 0                               CR2G3200
      C   OR IF ELEV = 0                                                CR2G3210
      C       IF THEY DO SET GFREE AND GBOUG EQUAL TO 999.0             CR2G3220
      C                                                                 CR2G3230
             IF(LAT)2050,2049,2050                                      CR2G3240
      2049  IF(RLATM)  2050,2051,2050                                   CR2G3250
      2051  IF(LONG)  2050,2052,2050                                    CR2G3260
      2052   IF(RLOM)  2050,2053,2050                                   CR2G3270
      C                                                                 CR2G3280
       2050  IF    (ELEV) 2054,2053,2054                                CR2G3290
       2053 GFREE=999.0                                                 CR2G3300
          GBOUG=999.0                                                   CR2G3310
      2054   CONTINUE                                                   CR2G3320
      C                                                                 CR2G3330
          NSTATN=LSTAT                                                  CR2G3340
      C                                                                 CR2G3350
      C                                                                 CR2G3360
      C * COMPUTE GSUM SORT KEY FIELDS                                  CR2G3370
      C                                                                 CR2G3380
           PLAT  = DLAT + 90.                                           CR2G3390
           LTKEY = PLAT                                                 CR2G3400
           PLON  = DLON + 180.                                          CR2G3410
           LGKEY = PLON                                                 CR2G3420
           IAKEY = 0                                                    CR2G3430
      C                                                                 CR2G3440
      C *******************                                             CR2G3450
      C *                                                               CR2G3460
      C * OUTPUT THE DESIRED INFORMATION                                CR2G3470
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C *                                                                     CR2G3480
C ********************                                                  CR2G3490
C                                                                       CR2G3500
C * PUNCH ØUTPUT FØR INPUT TØ STATIØN DESCRIPTIØN PRØGRAM               CR2G3510
C   IPCS PREVENTS US FRØM PUNCHING THE REFERENCE STATIØN WHEN           CR2G3520
C       IT IS THE FIRST CARD ØUT                                        CR2G3530
C                                                                       CR2G3540
      IF    (IPCS.EQ.1)  GØTØ 835                                       CR2G3550
      IF    (ISW(2)) 835,825,835                                        CR2G3560
  825 WRITE (JTAPE,5825) LYR,MØ,LDAY,LTIME,LSTAT,IGM(1),IGM(2),         CR2G3570
     1   IG,GØBS,LSTA,IBASE,BASEG(2),RLAT,SØRN,RLØNG,WØRE,ELEV          CR2G3580
  835 CØNTINUE                                                          CR2G3590
C                                                                       CR2G3600
C * LISTING ØF CALCULATED VALUES                                        CR2G3610
C                                                                       CR2G3620
      IF    (ISW(1)) 869,851,869                                        CR2G3630
  851 IF    (LCNT) 852,852,860                                          CR2G3640
C                                                                       CR2G3650
C   PRINT PAGE HEADING                                                  CR2G3660
C                                                                       CR2G3670
  852 WRITE (IØUT,5001)                                                 CR2G3680
      IF    (IPAGE - 1) 853,853,854                                     CR2G3690
  853 WRITE (IØUT,5853)                                                 CR2G3700
  854 CØNTINUE                                                          CR2G3710
      WRITE (IØUT,5200) IPAGE,KDATE                                     CR2G3720
      WRITE (IØUT,5855) LSTA, IDA1,IMØ1,IYR1,ITM1,IGM(1),IGM(2),LSRC    CR2G3730
      WRITE (IØUT,5856) IBASE,BASEG(2), REF, DENSE, DRFTCØ              CR2G3740
      WRITE (IØUT,5858)                                                 CR2G3750
      IPAGE = IPAGE + 1                                                 CR2G3760
      LCNT  = 39                                                        CR2G3770
C                                                                       CR2G3780
  860 WRITE (IØUT,5860)                                                 CR2G3790
     1   LSTAT,LDAY,MØ,LYR,LTIME,KTZ,LAT,RLATM,SØRN,CR,                 CR2G3800
     2   GFREE,CLS ,DIFFR,DESC                                          CR2G3810
      WRITE (IØUT,5862)                                                 CR2G3820
     1   IG,GØBS,KGDA,KGMØ,KGYR,KGHM,ELEV,LØNG,RLØM,WØRE,RELM,          CR2G3830
     2   GBØUG,HØNK,DRIFT,TIMD,ADAY                                     CR2G3840
      LCNT  = LCNT - 3                                                  CR2G3850
  869 CØNTINUE                                                          CR2G3860
C                                                                       CR2G3870
C * ØUTPUT AT GSUM FØRMAT  TØ KTAPE                                     CR2G3880
C   FØRMAT FØRWARD CØDE = 3                                             CR2G3890
C                                                                       CR2G3900
      IF    (ISW(4)) 889,871,889                                        CR2G3910
  871 WRITE (KTAPE,5871) IREC,LSRC,KGDA,KGMØ,KGYR,KGHM,DLAT,DLØN,ELEV,  CR2G3920
     1   IG,GØBS,IDEP,GFREE,GBØUG,TCØRR,IELC,IGC,RFA,IREGC,             CR2G3930
     2   IFFC,CLS,HØNK,CRN,(DESC(II),II=1,16),NSTATN,IFBC,              CR2G3940
     3   LTKEY,LGKEY,IAKEY                                              CR2G3950
  889 CØNTINUE                                                          CR2G3960
C                                                                       CR2G3970
C * STMT. #890 IS THE END ØF THE READ DØ-LØØP                           CR2G3980
C                                                                       CR2G3990
  890 CØNTINUE                                                          CR2G4000
C                                                                       CR2G4010
C ********************                                                  CR2G4020
C *                                                                     CR2G4030
C * END ØF JØB                                                          CR2G4040
C *                                                                     CR2G4050
C ********************                                                  CR2G4060
C                                                                       CR2G4070
```

```
180   CØNTINUE                                                                CR2G4080
181   CØNTINUE                                                                CR2G4090
  910  CØNTINUE                                                               CR2G4100
       WRITE (IØUT,5001)                                                      CR2G4110
       ØUTPUT ICØUNT                                                          CR2G4120
      IF(ISW(4).GT.0)  GØ TØ 24                                               CR2G4130
       ENDFILE KTAPE                                                          CR2G4140
 5950  WRITE (IØUT,5950)                                                      CR2G4150
       REWIND KTAPE                                                           CR2G4160
 24   CØNTINUE                                                                CR2G4170
       IPAGE = 0                                                              CR2G4180
       WRITE (IØUT,5200) IPAGE,KDATE                                          CR2G4190
      STØP                                                                    CR2G4200
C                                                                             CR2G4210
C *********************                                                       CR2G4220
C *                                                                           CR2G4230
C * FØRMATS                                                                   CR2G4240
C *                                                                           CR2G4250
C *********************                                                       CR2G4260
C                                                                             CR2G4270
 5001  FØRMAT (1H1)                                                           CR2G4280
 5150  FØRMAT (I2,F7.2)                                                       CR2G4290
 5200  FØRMAT (T2'PAGE'I4,T35'DATE ØF RUN = '4A4)                             CR2G4300
 5230  FØRMAT (2A4,2X,F10.5,I5,I5,I5)
 5285  FØRMAT (' G-METER = '2A4'  DRFTCØ = 'F10.5,5X'SØURCE CØDE ='I4
    1     '    ELEV CØDE ='I4,5X'G METER CØDE ='I4)
 5290  FØRMAT (' TABLE: '5(I2,':',F7.2))                                      CR2G4330
 5320  FØRMAT (F3.0,F6.2)                                                     CR2G4340
 5330  FØRMAT (F4.2)                                                          CR2G4350
 5405  FØRMAT (I4,3I2,I4,F8.3,I2,F5.2,A1,I3,F5.2,A1,F7.1,I3,31A1)             CR2G4360
 5825  FØRMAT(3I2,I4,1X,I4,2A4,I3,F6.2,1X,I4,I3,F6.2,2(F9.6,A1),F7.1)         CR2G4370
 5855  FØRMAT (/'  REFERENCE STATIØN ='I5,10X'READING ØF '3(I2'/')I4,         CR2G4380
    1    5X,'METER = '2A4,5X'SØURCE CØDE ='I4)                                CR2G4390
 5853  FØRMAT (T2'*** NEW REFERENCE STATIØN ***'/                             CR2G4400
    1    T2'******************************' )                                 CR2G4410
 5856  FØRMAT ('  REFERENCE GRAVITY = 'I3,F6.2,7X'REL MGAL = 'F11.3,          CR2G4420
    1    5X'DENSE =',F5.2,9X'DRFTCØ ='F6.4//)                                 CR2G4430
 5858  FØRMAT (' STATIØN'10X'DATE'10X'TZ'4X'LATITUDE'2X'CTR RDNG'             CR2G4440
    1    4X'GFREE'3X'CLS' 5X'GDIFF'2X'DESCRIPTIØN'/                           CR2G4450
    2    ' ØBS GRAV'5X'GMT DATE'8X'ELEV'3X'LØNGITUDE'2X'REL MGAL'             CR2G4460
    3    4X'GBØUG'2X'HØNK'2X'ACUM DFT'7X'TDIFF'2X'DA-ØF-YR'/)                 CR2G4470
 5860  FØRMAT (' ',I4,7X,3(I2'/')I4,6X,I3,2X,I3,1X,F5.2,A1,3X,                CR2G4480
    1    2(F7.2,2X),F4.2,1X,F9.3,2X,31A1)
 5862  FØRMAT (' ',I3,F6.2,2X,3(I2'/')I4,2X,F7.1,2X,I3,1X,F5.2,A1,3X,         CR2G4500
    1    2(F7.2,2X)F4.2,2X,F8.2,2X,F10.2,2X,F8.4,                             CR2G4510
    2    /)                                                                   CR2G4520
 5871  FØRMAT (I1,I4,3I2,I4,2F9.4,F7.2,                                       CR2G4530
    1    I3,F6.2,I5,2F6.1,F4.1,2I2,F6.1,I1,                                   CR2G4540
    2    I2,2F4.2,F7.2,16A1,I4,I2,                                            CR2G4550
    3    2I3,I2)                                                              CR2G4560
 5950 FØRMAT(' WRØTE END ØF FILE')                                            CR2G4570
C                                                                             CR2G4580
      END                                                                     CR2G4590
```

```
                         HEX    DEC                             HEX    DEC                             HEX    DEC
NAME    TYPE CLASS       LØC    WØRDS      NAME    TYPE CLASS   LØC    WØRDS      NAME    TYPE CLASS   LØC    WØRDS
----    ---- -----    -------   -----      ----    ---- -----  -------  -----      ----    ---- -----  -------  -----
ADAY       R SCALR    0008E V      1       ABDFT      R SCALR  0007E V     1      BASEG      R ARRAY  0004A V     2
BASG7      R SCALR    00098 V      1       BELEV      R SCALR  000D5 V     1      CDATE        SPRØG  EXTERN
CHGMT        SPRØG    EXTERN               CI         R SCALR  000B1 V     1      CLS        R SCALR  000AB V     1
CØS        R SPRØG    INTRIN               CR         R SCALR  000AD V     1      CRN        R SCALR  000A0 V     1
C2         R SCALR    00082 V      1       C2R        R SCALR  000D1 V     1      DEC        D SCALR  00070 V     2
DENSE      R SCALR    00097 V      1       DESC       R ARRAY  0004C V    31      DIFFR      R SCALR  000C8 V     1
DLAT       R SCALR    000B5 V      1       DLØN       R SCALR  000B6 V     1      DRFTCØ     R SCALR  00092 V     1
DRIFT      R SCALR    000CA V      1       DTD        D SCALR  0006E V     2      ELEV       R SCALR  000A7 V     1
FELEV      R SCALR    000D2 V      1       FLØAT      R SPRØG  INTRIN             GBØUG      R SCALR  000D6 V     1
GFREE      R SCALR    000D4 V      1       GI67F      R SPRØG  EXTERN             GØBS       R SCALR  000CE V     1
GØBS7      R SCALR    000CB V      1       HØNK       R SCALR  000AC V     1      I          I SCALR  0009A V     1
IAKEY      I SCALR    000DC V      1       IBASE      I SCALR  00099 V     1      IBLNK      I SCALR  0007A V     1
ICØN       I SCALR    000CC V      1       ICØUNT     I SCALR  00083 V     1      ID         I SCALR  000BB V     1
IDA1       I SCALR    000C2 V      1       IDEP       I SCALR  00086 V     1      IELC       I SCALR  00094 V     1
IFBC       I SCALR    0008D V      1       IFFC       I SCALR  0008C V     1      IG         I SCALR  000CF V     1
IGC        I SCALR    00095 V      1       IGM        I ARRAY  0006B V     2      IG18       I SCALR  0007C V     1
IHR        I SCALR    000BF V      1       II         I SCALR  00096 V     1      IIN        I SCALR  0007F V     1
IK         I SCALR    000A9 V      1       ILR        I SCALR  0007B V     1      IMIN       I SCALR  000C0 V     1
IMØ1       I SCALR    000C3 V      1       INN        I SCALR  00091 V     1      IØUT       I SCALR  00080 V     1
IPAGE      I SCALR    00084 V      1       IPCS       I SCALR  000AA V     1      IREC       I SCALR  00085 V     1
IREGC      I SCALR    00088 V      1       ISW        I SPRØG  EXTERN             ITM1       I SCALR  000C5 V     1
IYR1       I SCALR    000C4 V      1       J          I SCALR  0008F V     1      JTAPE      I SCALR  00081 V     1
K          I SCALR    0008E V      1       KDATE      I ARRAY  00000 V     4      KGDA       I SCALR  000B7 V     1
KGHM       I SCALR    000BA V      1       KGMØ       I SCALR  000B8 V     1      KGYR       I SCALR  000B9 V     1
KTAPE      I SCALR    00082 V      1       KTT        I SCALR  0008C V     1      KTZ        I SCALR  000A8 V     1
LAT        I SCALR    000A1 V      1       LC         I SCALR  000B0 V     1      LCNT       I SCALR  000C7 V     1
LDAY       I SCALR    0009C V      1       LELC       I SCALR  0008A V     1      LGC        I SCALR  0008B V     1
LGKEY      I SCALR    000DB V      1       LØNG       I SCALR  000A4 V     1      LSRC       I SCALR  00093 V     1
LSRCD      I SCALR    0007D V      1       LSTA       I SCALR  000C6 V     1      LSTAT      I SCALR  0009B V     1
LTIME      I SCALR    0009F V      1       LTKEY      I SCALR  000D9 V     1      LYR        I SCALR  0009E V     1
MØ         I SCALR    0009D V      1       M2DY         SPRØG  EXTERN             NCR        I SCALR  000AE V     1
NSTATN     I SCALR    000D7 V      1       NTZ        I SCALR  000BD V     1      PLAT       R SCALR  000D8 V     1
PLØN       R SCALR    000DA V      1       RAD        D SCALR  00074 V     2      RA1        R SCALR  000D3 V     1
RDEG       R SCALR    000B4 V      1       REF        R SCALR  000C1 V     1      RELM       R SCALR  000B3 V     1
RFA        R SCALR    00087 V      1       RLAT       D SCALR  00072 V     2      RLATM      R SCALR  000A2 V     1
RLØM       R SCALR    000A5 V      1       RLØNG      D SCALR  00076 V     2      SØRN       R SCALR  000A3 V     1
SØUTH      R SCALR    00079 V      1       TABLE      R SCALR  00090 V     1      TCØRR      R SCALR  00089 V     1
TEMP       R SCALR    000CD V      1       TIDAL        SPRØG  EXTERN             TIMD       R SCALR  000C9 V     1
TØDAY        SPRØG    EXTERN               TUCR       R SCALR  000AF V     1      VALM       R ARRAY  00004 V    70
WEST       R SCALR    00078 V      1       WØRE       R SCALR  000A6 V     1      X          R SCALR  000D0 V     1


          HEX                 HEX                 HEX                 HEX                 HEX                 HEX
LABEL     LØC      LABEL      LØC      LABEL      LØC      LABEL      LØC      LABEL      LØC      LABEL      LØC
-----    -----     -----     -----     -----     -----     -----     -----     -----     -----     -----     -----
   24    002C6       180     002AC       181     002AC       210     0004C       294     0009C       300     000A0
  415    000E9       420     000EC       440     00183       450     00195       500     000E7       595     002C0
  610    00134       619     00155       620     00157       630     00180       825     00203       835     00218
  851    0021D       852     0021F       853     00226       854     0022A       860     0024E       869     00277
  871    0027C       889     002A8       890     002A8       910     002AC      2049     001DF      2050     001E5
 2051    001E1      2052     001E3      2053     001E7      2054     001EB      5001     002D2      5150     002D5
 5200    002D9      5230     002E3      5285     002EA      5290     00303      5320     0030B      5330     0030F
 5405    00312      5825     00320      5853     00347      5855     0032F      5856     0035A      5858     00372
 5860    003A6      5862     003BB      5871     003D5      5950     003ED
```

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LØCAL VARIABLES (221 WØRDS):

   00000 KDATE     00004 VALM      0004A BASEG     0004C DESC      0006B IGM       0006E DTD
   00070 DEC       00072 RLAT      00074 RAD       00076 RLØNG     00078 WEST      00079 SØUTH
   0007A IBLNK     0007B ILR       0007C IG18      0007D LSRCD     0007E ASDFT     0007F IIN
   00080 IØUT      00081 JTAPE     00082 KTAPE     00083 ICØUNT    00084 IPAGE     00085 IREC
   00086 IDEP      00087 RFA       00088 IREGC     00089 TCØRR     0008A LELC      0008B LGC
   0008C IFFC      0008D IFBC      0008E K         0008F J         00090 TABLE     00091 INN
   00092 DRFTCØ    00093 LSRC      00094 IELC      00095 IGC       00096 II        00097 DENSE
   00098 BASG7     00099 IBASE     0009A I         0009B LSTAT     0009C LDAY      0009D MØ
   0009E LYR       0009F LTIME     000A0 CRN       000A1 LAT       000A2 RLATM     000A3 SØRN
   000A4 LØNG      000A5 RLØM      000A6 WØRE      000A7 ELEV      000A8 KTZ       000A9 IK
   000AA IPCS      000AB CLS       000AC HØNK      000AD CR        000AE NCR       000AF TUCR
   000B0 LC        000B1 CI        000B2 C2        000B3 RELM      000B4 RDEG      000B5 DLAT
   000B6 DLØN      000B7 KGDA      000B8 KGMØ      000B9 KGYR      000BA KGHM      000BB ID
   000BC KTT       000BD NTZ       000BE ADAY      000BF IHR       000C0 IMIN      000C1 REF
   000C2 IDA1      000C3 IMØ1      000C4 IYR1      000C5 ITM1      000C6 LSTA      000C7 LCNT
   000C8 DIFFR     000C9 TIMD      000CA DRIFT     000CB GØBS7     000CC ICØN      000CD TEMP
   000CE GØBS      000CF IG        000D0 X         000D1 C2R       000D2 FELEV     000D3 RA1
   000D4 GFREE     000D5 BELEV     000D6 GBØUG     000D7 NSTATN    000D8 PLAT      000D9 LTKEY
   000DA PLØN      000DB LGKEY     000DC IAKEY

BLANK CØMMØN (0 WØRDS)

INTRINSIC SUBPRØGRAMS USED:

   CØS        FLØAT

EXTERNAL SUBPRØGRAMS REQUIRED:

   CDATE      CHGMT      GI67F      ISW        M2DY       TIDAL      TØDAY     `F:101
   F:102      F:103      F:104      F:105      F:106      F:108      M:DØ       M:ØC
   9BCDRDEE   9BCDREAD   9BCDWRIT   9CØS       9DTØR      9ENDFILE   9ENDIØL    9INITIAL
   9IØDATA    9IØLUSA.   9ITØR      9PRINT     9REWIND    9RTØI      9STØP

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                       DEC       HEX
                      WØRDS     WØRDS
                      -----     -----
  GENERATED CØDE:     1014      003F6
       CØNSTANTS:       30      0001E
 LØCAL VARIABLES:      221      000DD
           TEMPS:        1      00001
                      -----     -----
   TØTAL PRØGRAM:     1266      004F2
```

Compiled 1 Apr 1972

```
C       PRØGRAM CRWT3
C         VERTIØN ØF 7 MARCH 1972,TØ USE PINØT
C
        DIMENSIØN TAB(100),IDESC(6),VEL(8),THICK(8),X(8)
        DIMENSIØN NØW(4)
C
C  PRØGRAM CRWT3, CALCULATES PRESSURE AT BASE ØF CRUSTAL
C  CØLUMN  (KG/CM2)
C
C  SSW(0) UP TØ LIST INTERMEDIATE VALUES FØR TESTING
C  SSW(26)  UP TØ SET JTAPE = 108  AND IREC1 = 0
C  SSW(32)  UP TØ READ SPFMT DATA ØN TWØ CARDS
C  SSW(33)  UP TØ WRITE SPFMT DATA ØN TWØ CARDS
C
C       USES SUBRØUTINES EVIL, ISW, STAT
C
C
C  ***************************************************
C  ITAPE = URN FØR SEISMIC DATA INPUT
C  JTAPE = URN FØR DATA ØUTPUT
        ITAPE = 1
        JTAPE = 2
C  ***************************************************
C
        IIN = 105
        IIØUT = 108
        NØUT=0
C
C      PRINT DATE AND TIME ØF JØB ØN HEADING
        CALL TØDAY(NØW)
        WRITE(IIØUT,13) NØW
   13   FØRMAT(1X,4A4)
        INIT = ISW(-2)
        CALL STAT
        K9 = 1H9
        ISTAØ=0
        WRITE (IIØUT,600)
  600   FØRMAT ( / 'PRØGRAM  CRWT3,VERSIØN ØF 7 MARCH,1972' //)
C
        KK=0
        CALL        PINØT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,[illegible],
     1  LØNG,LØM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,M[illegible]YR,IDESC,
     2  DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
C
C
C  DCØMP = DEPTH ØF CØMPENSATIØN IN KM.
C         ICTAB = 0 FØR NAFE DRAKE,  = 1 FØR WØØLARD DENSITY TABLE
        READ (IIN, 2) ICTAB, DCØMP
  2     FØRMAT (I5, F10.0)
        ØUTPUT ICTAB, DCØMP
C       READ IN 10 VALUES PER CARD
        READ (IIN, 3) TAB
  3       FØRMAT (10F8.3)
C      100 VALLES ENTERED
C
C  READING U ØF TØRØNTØ WØRLD SEISMIC REFRACTIØN CØMPILATIØN
 10       CØNTINUE
          KK=1
          CALL        FINØT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,
      1    LØNG,LØM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,
      2    DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
          IF(KK-9)120,540,120
   120    CØNTINUE
          IF(ISW(0))16,13,16
    16    WRITE(IIØUT,17) ISTA,KEY,VMANT,ELEV,N1,N2,N3,N4
    17    FØRMAT('READ',3X,I5,I3,F5.1,F7.1,3X,4I1)
C  CHECKING IF KEY = 9
    13    IF(KEY-K9)20,10,20
    20    CØNTINUE
          ELEV=NELEV
          ELEV=ELEV*0.01
          VMANT=(FLØAT(IMANT))*0.1
          NCT=8
    45    IF(IMANT)50,850,50
    50    IF(N1-2) 70,60,70
C  SEA SEISMIC PRØFILE
    60    DINE = ELEV
          WGT = 1.03*ELEV*100.0
          GØ TØ 80
C  LAND SEISMIC PRØFILE
    70    DINE = -ELEV
          WGT = 0.0
    80    WATW = WGT
          IF(ISW(0))81,83,81
    81    WRITE(IIØUT,82)DINE,WGT
    82    FØRMAT('DINE=',F4.2,4X,'WGT=',F10.2)
    83    SX = 0.0
          STHIK = 0.0
          DØ 86 J=1,NCT
          KK = VEL(J)*10.0
          DENS = TAB(KK)
          WGT = WGT+(DENS*THICK(J)*100.0)
          DINE = DINE + THICK(J)
          X(J) = VEL(J)*THICK(J)
          SX = SX + X(J)
          STHIK = STHIK + THICK(J)
          IF(ISW(0))84,86,84
    84    WRITE(IIØUT,85)J,KK,THICK(J),DENS,WGT,DINE,
      1    X(J),SX,STHIK
    85    FØRMAT('DØ LØØP',2X,I2,I4,2X,F4.1,2X,F4.2,
      1    2X,F10.2,2X,F4.1,2X,F6.2,2X,F6.2,2X,F4.1)
    86    CØNTINUE
          CRVEL = SX/STHIK
          KK = CRVEL*10.0+0.5
          CRDEN = TAB(KK)
      KK = VMANT*10.0+0.5
      DENS = TAB(KK)
      A = CRDEN*STHIK*100.0
      B = DENS*(DCØMP-DINE)*100.0
      IF(ISW(0))90,95,90
   90 WRITE(IIØUT,92)CRDEN,DENS,A,B
   92 FØRMAT('CRDEN=',F5.2,3X,'DENS=',F5.2,4X,
     1 'A=',F10.2,3X,'B=',F10.2)
   95 WGT = WGT + B
      AVWGT = WATW +A +B
C
C  SETTING UP FØR PRØPER ØUTPUT
      IF(ICTAB)810,820,810
  810 CRVW = CRVEL
      WGTW = WGT
      AVWTW= AVWGT
      GØ TØ 850
  820 CRVN = CRVEL
      WGTN = WGT
      AVWTN= AVWGT
C ØUTPUT RESULTS
  850 CØNTINUE
      KK=-2
      CALL       PINØT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,
     1 LØNG,LØM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,
     2 DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
      NØUT=NØUT+1
      GØ TØ 10
  540 WRITE(IIØUT,545)NØUT
  545 FØRMAT('EØF FØUND ØN INPUT TAPE  ',I10)
      NØUT=0
      END FILE JTAPE
  999 CALL EXIT
      END
```

```
                           HEX     DEC                               HEX     DEC                               HEX     DEC
NAME   TYPE CLASS          LØC     WØRDS    NAME   TYPE CLASS        LØC     WØRDS    NAME   TYPE CLASS        LØC     WØRDS
----   ---- -----        -------   -----    ----   ---- -----      -------   -----    ----   ---- -----      -------   -----
A         R SCALR       000B3 V      1      AVWGT     R SCALR     000B5 V      1      AVWTN     R SCALR     000A3 V      1
AVWTW     R SCALR       000A6 V      1      B         R SCALR     000B4 V      1      CRDEN     R SCALR     000B2 V      1
CRVEL     R SCALR       000B1 V      1      CRVN      R SCALR     000A1 V      1      CRVW      R SCALR     000A4 V      1
DCØMP     R SCALR       000A8 V      1      DENS      R SCALR     000B0 V      1      DINE      R SCALR     0009F V      1
ELEV      R SCALR       000AA V      1      EXIT        SPRØG     EXTERN              FLØAT     R SPRØG     INTRIN
ICTAB     I SCALR       000A7 V      1      IDESC     I ARRAY     00064 V      6      IIN       I SCALR     00088 V      1
IIØUT     I SCALR       00089 V      1      IMANT     I SCALR     00097 V      1      INIT      I SCALR     0008B V      1
ISTA      I SCALR       0008F V      1      ISTAB     I SCALR     0008D V      1      ISW       I SPRØG     EXTERN
ITAPE     I SCALR       00086 V      1      IYR       I SCALR     0009E V      1      J         I SCALR     000AF V      1
JTAPE     I SCALR       00087 V      1      KEW       I SCALR     00096 V      1      KEY       I SCALR     00090 V      1
KK        I SCALR       0008E V      1      KNS       I SCALR     00093 V      1      K9        I SCALR     0008C V      1
LAT       I SCALR       00091 V      1      LATM      I SCALR     00092 V      1      LØM       I SCALR     00095 V      1
LØNG      I SCALR       00094 V      1      MET       I SCALR     0009D V      1      NCT       I SCALR     000AB V      1
NELEV     I SCALR       00098 V      1      NØUT      I SCALR     0008A V      1      NØW       I ARRAY     00082 V      4
N1        I SCALR       00099 V      1      N2        I SCALR     0009A V      1      N3        I SCALR     0009B V      1
N4        I SCALR       0009C V      1      PINØT       SPRØG     EXTERN              STAT        SPRØG     EXTERN
STHIK     R SCALR       000A0 V      1      SX        R SCALR     000AE V      1      TAB       R ARRAY     00000 V    100
THICK     R ARRAY       00072 V      8      TØDAY       SPRØG     EXTERN              VEL       R ARRAY     0006A V      8
VMANT     R SCALR       000A9 V      1      WATW      R SCALR     000AD V      1      WGT       R SCALR     000AC V      1
WGTN      R SCALR       000A2 V      1      WGTW      R SCALR     000A5 V      1      X         R ARRAY     0007A V      8

         HEX               HEX               HEX               HEX               HEX               HEX
LABEL    LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
    2   0005A         3   00072        10   00075        13   00014        16   0009F        17   000AB
   18   000B5        20   00088        45   000C4        50   000C6        60   000C9        70   000D0
   80   000D5        81   000DC        82   000E2        83   000EB        84   0010E        85   0011F
   86   00134        90   0015A        92   00162        95   00172       120   0009A       540   001AC
  545   001B1       600   00025       810   0017B       820   00182       850   00188       999   001BF

LØCAL VARIABLES (182 WØRDS):

    00000 TAB        00064 IDESC      0006A VEL        00072 THICK      0007A X          00082 NØW
    00086 ITAPE      00087 JTAPE      00088 IIN        00089 IIØUT      0008A NØUT       0008B INIT
    0008C K9         0008D ISTAB      0008E KK         0008F ISTA       00090 KEY        00091 LAT
    00092 LATM       00093 KNS        00094 LØNG       00095 LØM        00096 KEW        00097 IMANT
    00098 NELEV      00099 N1         0009A N2         0009B N3         0009C N4         0009D MET
    0009E IYR        0009F DINE       000A0 STHIK      000A1 CRVN       000A2 WGTN       000A3 AVWTN
    000A4 CRVW       000A5 WGTW       000A6 AVWTW      000A7 ICTAB      000A8 DCØMP      000A9 VMANT
    000AA ELEV       000AB NCT        000AC WGT        000AD WATW       000AE SX         000AF J
    000B0 DENS       000B1 CRVEL      000B2 CRDEN      000B3 A          000B4 B          000B5 AVWGT

BLANK CØMMØN (0 WØRDS)
```

```
INTRINSIC SUBPRØGRAMS USED:

   FLØAT

EXTERNAL SUBPRØGRAMS REQUIRED:

   EXIT       ISW        PINØT      STAT       TØDAY      F:101      F:102      F:103
   F:104      F:105      F:106      F:108      M:DØ       M:ØC       9BCDREAD   9BCDWRIT
   9ENDFILE   9ENDIØL    9INITIAL   9IØDATA    9IØLUSA    9ITØR      9PRINT     9RTØ.
   9STØP

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC       HEX
                    WØRDS     WØRDS
                    -----     -----
 GENERATED CØDE:     451      001C3    (NØ MEMØRY PRØTECTIØN)
      CØNSTANTS:       9      00009
LØCAL VARIABLES:     182      000B6
          TEMPS:       0      00000
                    -----     -----
  TØTAL PRØGRAM:     642      00282
```

```
C       PROGRAM DMABLK
C       PROGRAM TO READ BLOCKED BY 50 DMA SOURCE TAPES
C       AND CONVERT THEM TO BLOCKED BY 50 GSUM TAPES (IFFC=9)
C        HYBRID OF PROGRAM DMA AND CONV67
C       VERSION 20 AMY 75 TO REMOVE DOUBLE BUFFER
C       VERSION OF 12 MAY 75 TO ZERO VARIABLES FOR CP-V
C       VERSION ON 20 DEC 74 TO CORRECT TEST OG IELEV AND ZEROING OUT
C                                    ELEV,IDEP,FA,BG,AND TC
C
C         VERSION 30 SEPT 74 TO CORRTECT SPELLING OF ISLAT IN READ
C       ORIGINAL VERSION 25 JULY 1974 BY 6. GOVE
         DIMENSION IA(35)
        DIMENSION IBUFIN(21,50),IBUFOT(32,50)
         DIMENSION IZ( 9),IW(35)
        DOUBLE PRECISION GOBS
        INTEGER ONE,TWO
         INTEGER THREE,FOUR,FIVE
        INTEGER SIX,SEVEN,EIGHT,NINE,DEE
        DATA ONE,TWO/'1   ','2   '/
        DATA THREE,FOUR,FIVE/'3   ','4   ','5   '/
        DATA SIX,SEVEN,EIGHT/'6   ','7   ','8   '/
        DATA NINE,DEE/'9   ','D   '/
         JNEG=1H-
        OUTPUT 'DMABLK VERSION 20 MAY 75'
        OUTPUT ' ON DEC 12 74 IT WAS DISCOVERED THAT'
        OUTPUT 'THE LOGIC IN PROGRAM DMA DID NOT HANDLE'
        OUTPUT 'ELEVATON CODES OTHER THAN 1 AND 3 CORRECCTLY'
        OUTPUT 'IT WAS ALSO DISCOVERED THAT DMABLK DID NOT ZERO'
        OUTPUT ' ELEV AND IDEP.  TO FIX THIS A TEMPORARY '
        OUTPUT ' VERSION OF DMABLK WAS MADE'
        OUTPUT ' THIA VERSION WRITES 1 AN 3 IN GSUM '
        OUTPUT 'BUT JUST PASSES ALL OTHER ELEV CODES TO LTAPE'
        OUTPUT ' IN DMA FORMAT.  ALL GSUM O/P IS GOOD'
        OUTPUT '    -     LEE GOVE DEC 13 74'
         ITAPE=1
         JTAPE=2
        LTAPE=3
        NRECRD=0
        IODBAL=0
        IN=105
        IOUT=108
        IREC2=2
        ITAPE=1
        JTAPE=2
        KTAPE=108
        ICNT=0
        NIN=50
        NOUT=0
        IOUTSW=0
        DEGRA=1.745329E-2
         KK=0
         KI=1
         KO=-2
         NREC=0
        A=0.0
        DLAT=0.0; DLONG=0.0
        HEIGT=0.0
        IAKEY=0
        IDEIF=0
```

```
      IEOD=0
C
C        INPUT STARTING SEQUENCE NUMBER FOR ID
C
       READ(IN,8)NSEQ
    8  FORMAT(I10)
       OUTPUT NSEQ
      READ (IN,505) ISORC
  505 FORMAT (I5)
       OUTPUT ISORC
      KGDA=0
      KGMO=0
      KGYR=0
      KGHM=0
       IDIF=0
       KGDAB=0
       KGMOB=0
       KGYRB=0
      IELC=0
      IGC=0
      IREGC=0
       IFFC=9
      IFBC=0
       RFA=0.0
C     BUFFER LOGIC FOR I/P
C
   10 CONTINUE
      IF(NIN.LT.50) GO TO 90
      NIN=0
      CALL BUFF IN(ITAPE,0,IBUFIN(1,1),1050)
   15 CONTINUE
      CALL ICHECK(ITAPE,IKEY,NI)
      GO TO (20,50,30,40) IKEY
   20 OUTPUT 'WAITING FOR I/P'; IEOD=0
      GO TO 15
   30 OUTPUT 'END OF FILE ON ITAPE';IEOD=1
      GO TO 50
   40 OUTPUT 'NUFFER IN ERROR';IEOD=1
      GO TO 999
   50 CONTINUE
C
C     INPUT LOGIC
C
   90 CONTINUE
      NIN=NIN+1
      IF(NI.EG.1050) GO TO 95
C     GOING TO EOF PROCESSING
      NINCHK=NIN*21
      IF(NINCHK.GT.NI) GO TO 999
   95 CONTINUE
      ELEV=0.0
      IDEP=0
      FA=999.0
      BG=999.0
      TC=99.9
      NRECRD=NRECRD+1
      DECODE(84,500,IBUFIN(1,NIN),ND)
     A                IGEOC,ISLAT,LAT,ALAT,ISLG,LONG,ALONG,IELEV,IELU,
     A   ELEV,DEPIN,GOBS,
     A  FA,BG,SOURCE,IBASE,IBR,ISEQ
  500 FØRMAT(2X,I1,A1,I2,F4.2,1X,A1,I3,F4.2,1X,A1,I1,F7.1,1X,F5.1,1X,
     A   F6.2,1X,
     A  F5.1,1X,F5.1,3X,A4,1X,A4,A1,1X,A4,4X)
C
C     EDIT LØGIC
C
C
C         TØ ØUTPUT RECØRD SEQUENCE NUMBER IN STATIØN NUMBER FIELD
C
       A=NSEQ
       KGYR=A*0.0001
       B=KGYR*10000
       KGHM=A-B
  507  KGHMØ=KGHM
       KGYRØ=KGYR
C   GRØUPING VARIABLES FØR ØUTPUT UNDER ARRAY IA
       ENCØDE(35,410,IZ) SØURCE,IBASE,IBR,ISEQ,IELEV
  410  FØRMAT(3X,A4,1X,A4,A1,1X,A4,1X,A1,15X)
       CALL UNPKBY(IZ,IW,35)
       DØ 420 J=1,35
       IA(J)=ISL(IW(J),24)
  420  CØNTINUE
C
C      CALCULAT LAT,LØNG,AND KEYS
C
      DLAT=FLØAT(LAT)+(ALAT/60.0)
      IF(ISLAT.EQ.JNEG)DLAT=-DLAT
      DLØNG=FLØAT(LØNG)+ALØNG/60.0
      IF(ISLG.EQ.JNEG)DLØNG=-DLØNG
      PLAT=DLAT+90.0;LTKEY=PLAT
      PLØNG=DLØNG+180.0;LGKEY=PLØNG
C    CHECKING GEØGRAPHIC CØØRDINATE CØDE
       IF(IGEØC.EQ.1)WRITE(IIØUT,510)SØURCE,ISEQ ; GØ TØ 99
  510  FØRMAT(' GEØ CØDE = 1, STØPPED PRØCESSING AT ',A4,2X,A4)
       IF(IGEØC.EQ.2)WRITE(IIØUT,520)SØURCE,ISEQ ; GØ TØ 99
  520  FØRMAT(' GEØ CØDE = 2, STØPPED PRØCESSING AT ',A4,2X,A4)
C    CØNVERT ELEVATIØN TØ METERS DEPENDING ØN CØDE
      IF(IELU.EQ.1)  ELEV=ELEV/3.281
      IF(IELU.EQ.2)     ELEV=ELEV/19.686
      IF(IELEV.EQ.ØNE) GØ TØ 5215
      IF(IELEV.EQ.THREE) IDEP=ELEV;ELEV=0.0;GØ TØ 5215
      IØDBAL=IØDBAL+1
      WRITE(LTAPE,5555) (IBUFIN(KK,NIN),KK=1,21)
 5555 FØRMAT(21A4)
      GØ TØ 10
 5215 CØNTINUE
       IF(GØBS - 0.05) 521,521,524
  521  K977 = 0
        ØBSG = 0.0
       GØ TØ 528
  524 GØBS=GØBS+976000.00
       CALL ØBGD(K977,ØBSG,GØBS,KØ)
C  CHECKING FØR VALID HEIGT
  528  CALL ALTD(ELEV,IDEP,HEIGT,KK)
       IF(KK-9)550,530,550
  530  BG=999.0
C   ØUTPUT GSUM RECØRD
  550  CØNTINUE
C
C      ØUTPUT LØGIC
```

```
      C
        300 CØNTINLE
            NØUT=NØUT+1
            ENCØDE(128,1001,IBUFØT(1,NØUT),NC) IREC2,ISØRC,KGDA,KGMØ,
           1    KGYR,KGHM,DLAT,DLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,TC,IELC,
           2     IGC,RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
              NREC=NREC+1
              NSEG=NSEG+1
              KGHMØ=KGHM
        305 CØNTINUE
            IF(NØUT.LT.50) GØ TØ 10
      C
      C      BUFFER LØGIC FØR Ø/P
      C
        310 CØNTINUE
            JKEY=ICHECK(JTAPE)
            GØ TØ (320,350,330,340) JKEY
        320 ØUTPUT 'WAITING FØR Ø/P' ; IEØD=0
            GØ TØ 310
        330 ØUTPUT'END ØF FILE JTAPE'  ;IEØD=1
            GØ TØ 999
        340 ØUTPUT 'BUFF ØUT ERRØR' ; IEØD=1
            GØ TØ 999
        350 CØNTINUE
            NØUT=0
            CALL BUFF ØUT(JTAPE,0,IBUFØT(1,1),1600)
            GØ TØ 10
      C
      C     END ØF JØB
      C
        999 CØNTINUE
        910 CØNTINUE
            JKEY=ICHECK(JTAPE)
            GØ TØ (920,950,930,940) JKEY
        920 ØUTPUT 'WAITING FØR Ø/P' ; IEØD=0
            GØ TØ 910
        930 ØUTPUT 'BAD JKEY' ; IEØD=1
            GØ TØ 960
        940 ØUTPUT 'BUFF ØUT ERRØR' ; IEØD=1
            GØ TØ 960
        950 CØNTINUE
            JWDS=NØUT*32
            CALL BUFF ØUT(JTAPE,0,IBUFØT(1,1),JWDS)
        960 CØNTINUE
         99 CØNTINUE
            END FILE LTAPE
            END FILE JTAPE
             NSEG=NSEG-1
             WRITE(IØUT,1090)NREC,NSEG
       1090  FØRMAT('END  DMA  RUN, DATA PØINTS WRITTEN = ',I8,
          1          'LAST SEQUENCE NØ. = ', I10)
            WRITE(IØUT,1092) NRECRD
            WRITE(IØUT,1091) IØDBAL
            ØUTPUT 'ALL DØNE'
             CALL EXIT
      C
      C     FØRMATS
      C
         98 FØRMAT(1X,32A4)
       1001 FØRMAT(I1,I4,3I2,I4,2F9.4,F7.2,I3,F6.2,I5,2F6.1,F4.1,
     *     2I2,F6.1,I1,I2,35A1,1X,I1,2I3,I2)
 1091 FORMAT(3X,I5,1X,'ODDBALL RECORDS WRITTEN')
 1092 FORMAT(3X,I5,1X,'RECORDS READ')
      END
```

```
                    HEX     DEC                            HEX     DEC                             HEX     DEC
NAME   TYPE CLASS   LØC     WØRDS    NAME   TYPE CLASS     LØC     WØRDS    NAME    TYPE CLASS     LØC     WØRDS
----   ---- -----  -------- -----    ----   ---- -----   -------- -----    ----    ---- -----   -------- -----
A         R SCALR  00AC9 V      1    ALAT      R SCALR   00AEC V      1    ALØNG      R SCALR   00AEF V      1
ALTD        SPRØG  EXTERN            B         R SCALR   00AF7 V      1    BG         R SCALR   00AE6 V      1
BUFFIN      SPRØG  EXTERN            BUFFØUT     SPRØG   EXTERN            DEE        I SCALR   00AB5 V      1
DEGRA     R SCALR  00AC4 V      1    DEPIN     R SCALR   00AF2 V      1    DLAT       R SCALR   00ACA V      1
DLØNG     R SCALR  00ACB V      1    EIGHT     I SCALR   00AB3 V      1    ELEV       R SCALR   00AE3 V      1
EXIT        SPRØG  EXTERN            FA        R SCALR   00AE5 V      1    FIVE       I SCALR   00AB0 V      1
FLØAT     R SPRØG  INTRIN            FØUR      I SCALR   00AAF V      1    GØBS       D SCALR   00AAA V      2
HEIGT     R SCALR  00ACC V      1    IA        I ARRAY   00000 V     35    IAKEY      I SCALR   00ACD V      1
IBASE     I SCALR  00AF4 V      1    IBR       I SCALR   00AF5 V      1    IBUFIN     I ARRAY   00023 V   1050
IBUFØT    I ARRAY  0043D V   1600    ICHECK    I SPRØG   EXTERN            ICNT       I SCALR   00AC0 V      1
IDEIF     I SCALR  00ACE V      1    IDEP      I SCALR   00AE4 V      1    IDIF       I SCALR   00AD6 V      1
IELC      I SCALR  00ADA V      1    IELEV     I SCALR   00AF0 V      1    IELU       I SCALR   00AF1 V      1
IEØD      I SCALR  00ACF V      1    IFBC      I SCALR   00ADE V      1    IFFC       I SCALR   00ADD V      1
IGC       I SCALR  00ADB V      1    IGEØC     I SCALR   00AE9 V      1    IIØUT      I SCALR   00AFE V      1
IKEY      I SCALR  00AE0 V      1    IN        I SCALR   00ABC V      1    IØDBAL     I SCALR   00ABB V      1
IØUT      I SCALR  00ABD V      1    IØUTSW    I SCALR   00AC3 V      1    IREC2      I SCALR   00ABE V      1
IREGC     I SCALR  00ADC V      1    ISEG      I SCALR   00AF6 V      1    ISL        I SPRØG   INTRIN
ISLAT     I SCALR  00AEA V      1    ISLG      I SCALR   00AED V      1    ISØRC      I SCALR   00AD1 V      1
ITAPE     I SCALR  00AB7 V      1    IW        I ARRAY   00A86 V     35    IZ         I ARRAY   00A7D V      9
J         I SCALR  00AF9 V      1    JKEY      I SCALR   00B01 V      1    JNEG       I SCALR   00AB6 V      1
JTAPE     I SCALR  00AB8 V      1    JWCS      I SCALR   00B02 V      1    KGDA       I SCALR   00AD2 V      1
KGDAØ     I SCALR  00AD7 V      1    KGHM      I SCALR   00AD5 V      1    KGHMØ      I SCALR   00AF8 V      1
KGMØ      I SCALR  00AD3 V      1    KGMØØ     I SCALR   00AD8 V      1    KGYR       I SCALR   00AD4 V      1
KGYRØ     I SCALR  00AD9 V      1    KI        I SCALR   00AC6 V      1    KK         I SCALR   00AC5 V      1
KØ        I SCALR  00AC7 V      1    KTAPE     I SCALR   00ABF V      1    K977       I SCALR   00AFF V      1
LAT       I SCALR  00AEB V      1    LGKEY     I SCALR   00AFD V      1    LØNG       I SCALR   00AEE V      1
LTAPE     I SCALR  00AB9 V      1    LTKEY     I SCALR   00AFB V      1    ND         I SCALR   00AE8 V      1
NI        I SCALR  00AE1 V      1    NIN       I SCALR   00AC1 V      1    NINCHK     I SCALR   00AE2 V      1
NINE      I SCALR  00AB4 V      1    NØUT      I SCALR   00AC2 V      1    NREC       I SCALR   00AC8 V      1
NRECRD    I SCALR  00ABA V      1    NSEG      I SCALR   00AD0 V      1    ØBGD         SPRØG   EXTERN
ØBSG      R SCALR  00B00 V      1    ØNE       I SCALR   00AAC V      1    PLAT       R SCALR   00AFA V      1
PLØNG     R SCALR  00AFC V      1    RFA       R SCALR   00ADF V      1    SEVEN      I SCALR   00AB2 V      1
SIX       I SCALR  00AB1 V      1    SØURCE    R SCALR   00AF3 V      1    TC         R SCALR   00AE7 V      1
THREE     I SCALR  00AAE V      1    TWØ       I SCALR   00AAD V      1    UNPKBY       SPRØG   EXTERN


          HEX                HEX                HEX                HEX                HEX                HEX
LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC
-----    -----     -----    -----     -----    -----     -----    -----     -----    -----     -----    -----
    8    000E1        10    00119        15    00124        20    00132        30    0013E        40    0014C
   50    00158        90    00158        95    00162        98    00345        99    00313       300    00273
  305    0029C       310    0029F       320    002AC       330    002B8       340    002C5       350    002D1
  410    001BF       420    001D3       500    00187       505    000F2       507    001B1       510    00205
  520    0021D       521    0025A       524    0025F       528    00268       530    00271       550    00273
  910    002DA       920    002E7       930    002F3       940    002FE       950    0030A       960    00313
  999    002DA      1001    00349      1090    0031E      1091    0035E      1092    00368      5215    002[illegible]7
 5555    00253


LØCAL VARIABLES (2819 WØRDS):

   00000 IA          00023 IBUFIN      0043D IBUFØT      00A7D IZ          00A86 IW          00AAA GØBS
   00AAC ØNE         00AAC TWØ         00AAE THREE       00AAF FØUR        00AB0 FIVE        00AB1 SIX
   00AB2 SEVEN       00AB3 EIGHT       00AB4 NINE        00AB5 DEE         00AB6 JNEG        00AB7 ITAPE
   00AB8 JTAPE       00AB9 LTAPE       00ABA NRECRD      00ABB IØDBAL      00ABC IN          00ABD IØUT
   00ABE IREC2       00ABF KTAPE       00AC0 ICNT        00AC1 NIN         00AC2 NØUT        00AC3 [illegible]
   00AC4 DEGRA       00AC5 KK          00AC6 KI          00AC7 KØ          00AC8 NREC        00AC9 A
   00ACA DLAT        00ACB DLØNG       00ACC HEIGT       00ACD IAKEY       00ACE IDEIF       00ACF IEØD
   00AD0 NSEG        00AD1 ISØRC       00AD2 KGDA        00AD3 KGMØ        00AD4 KGYR        00AD5 KGHM
   00AD6 IDIF        00AD7 KGDAØ       00AD8 KGMØØ       00AD9 KGYRØ       00ADA IELC        00ADB IGC
   00ADC IREGC       00ADD IFFC        00ADE IFBC        00ADF RFA         00AE0 IKEY        00AE1 NI
   00AE2 NINCHK      00AE3 ELEV        00AE4 IDEP        00AE5 FA          00AE6 BG          00AE7 TC
   00AE8 ND          00AE9 IGEØC       00AEA ISLAT       00AEB LAT         00AEC ALAT        00AED ISLG
   00AEE LØNG        00AEF ALØNG       00AF0 IFLEV       00AF1 IELU        00AF2 DEPIN       00AF3 SØURCE
   00AF4 IBASE       00AF5 IBR         00AF6 ISEG        00AF7 B           00AF8 KGHMØ       00AF9 J
   00AFA PLAT        00AFB LTKEY       00AFC PLØNG       00AFD LGKEY       00AFE IIØUT       00AFF K977
   00B00 ØBSG        00B01 JKEY        00B02 JWDS

BLANK CØMMØN (0 WØRDS)

INTRINSIC SUBPRØGRAMS USED:

   FLØAT      ISL

EXTERNAL SUBPRØGRAMS REQUIRED:

   ALTD       BUFFIN     BUFFØUT    EXIT       ICHECK     ØBGD       UNPKBY     F:101
   F:102      F:103      F:104      F:105      F:106      F:108      M:DØ       M:ØC
   9BCDREAD   9BCDWRIT   9DECØDE    9ENCØDE    9ENDFILE   9ENDIØL    9INITIAL   9IØDATA
   9IØLLSA    9ITØR      9PRINT     9RTØI      9STØP

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC      HEX
                     WØRDS    WØRDS
                     -----    -----
  GENERATED CØDE:      882    00372
       CØNSTANTS:       17    00011
 LØCAL VARIABLES:     2819    00B03
           TEMPS:        1    00001
                     -----    -----
   TØTAL PRØGRAM:     3719    00E87
```

```
C       PRØGRAM DMAP
C    VERSIØN ØF 8 DEC 1975 TØ CHECK HEMISPHERES
C    VERSIØN  27 ØCT 1975
C      VERSIØN AUGUST 1968
        IMPLICIT REAL*8(A-H,Ø-Z)
         DIMENSIØN XC(4),YC(4),              SC(4),CC(4)
         DIMENSIØN EDEG(8),BDIF(8)
          DIMENSIØN LAT(4),LØNG(4)
         ØUTPUT 'DMAP - VERSIØN 8 DEC 1975'
C   CØNVERTS DIGITIZED PØSITIØN IN INCHES
C           TØ LATITUDE AND LØNGITUDE
C    NØ CØMMØN REQUIRED
C   ISW CHØICE DATA CARD GØES BEFØRE ITAPE ETC CARD
C    USES SUB CALSC(ARG), FUNC PARTM(ARG), FUNC ISW(N),
C           SUB RTØDM(ARG),FUNC DMTØR(ARG)
C
C  SSW(2)  UP TØ LIST INTERMEDIATE VALUES
C  SSW(3)  UP TØ LIST DATE AND SMIN FØR EACH DATA PØINT
C  SSW(5)  UP TØ ØUTPUT SMIN ØNLY IF GREATER THAN EPSIL
C
C     NYR=0 WILL TERMINATE PRØGRAM
C    START INITIALIZATIØN FØR SIGMA 7
          IIN=105
          IIØUT=108
         INIT = ISW (-2)
C   END INITIALIZATIØN FØR SIGMA 7
         DEGRA=1.745329E-2
         IHEMW=IHEMS=0
         ITYPE=0
         IGAL=0
         N60=0
         MAP=0
C  ITAPE = URN FØR DATA INPUT
C  JTAPE = URN FØR DATA ØUTPUT
C  FFAC  = FACTØR (0.1 TØ 1.00) USED IN ITERATIØN FØR
C               ESTIMATED LATITUDE TØ CØNVERGE ØN TRUE
C               LATITUDE.
C  EPSIL = TØLERANCE (IN MERIDIØNAL PARTS) BY WHICH
C               ESTIMATED LATITUDE MUST MATCH MERIDIØNAL
C               PARTS FØR TRUE LATITUDE.
          READ(IIN,6)ITAPE,JTAPE,FFAC,EPSIL
    6  FØRMAT(2I5,F5.2,F5.2)
C  READ IN DATA
    8  READ(ITAPE,15)ICØDE,XP,YP,NDA,NMØ,NYR,NHM
   15  FØRMAT(I1,1X,F5.3,1X,F5.3,3I3,I5)
C  CHANGING SIGN FØR WESTERN ØR SØUTHERN HEMISPHERE
        IF(IHEMW .GT.0) XP=-1.0*XP
        IF(IHEMS .GT.0) YP=-1.0*YP
         IF(ICØDE-9)50,20,50
C  SETTING MAP CØØRDINATE AND SCALE
   20  XC(1)=XP;YC(1)=YP;LAT(1)=NMØ;LØNG(1)=NYR
C  CHANGING SIGN FØR WESTERN ØR SØUTHERN HEMISPHERE
        IF(LØNG(1).LT.0) XC(1)=-1.0*XC(1);IHEMW=5
        IF(LAT(1).LT.0) YC(1)=-1.0*YC(1);IHEMS=5
         DØ 25 J=2,4
          READ(ITAPE,15)ICØDE,XC(J),YC(J),N1,N2,LAT(J),LØNG(J)
C  CHANGING SIGN FØR WESTERN ØR SØUTHERN HEMISPHERE
        IF(LØNG(1).LT.0) XC(J)=-1.0*YC(J)
   25 CθNTINUE
      MAP=MAP+1
C  DETERMINING AVERAGE SIN AND CθS θF ANGLE θF TILT θF MAP
      CALL CALSC(XC(1),YC(1),XC(2),YC(2),SC(1),CC(1))
       CALL CALSC(YC(2),XC(3),YC(3),XC(2),SC(2),CC(2))
      CALL CALSC(XC(4),YC(4), XC(3),YC(3),SC(3),CC(3))
       CALL CALSC(YC(1),XC(4),YC(4),XC(1),SC(4),CC(4))
      AS = (SC(1)+SC(2)+SC(3)+SC(4))/4.0
      AC = (CC(1)+CC(2)+CC(3)+CC(4))/4.0
C   LIST CALCULATED SIN AND CθS θF ANGLE θF TILT θF MAP
      WRITE(IIθUT,24)MAP,AS,AC
   24 FθRMAT('MAP = ',I4,' SIN A = ', F8.6,' CθS A = 'F8.6)
       IF(ISW(2))26,30,26
   26 WRITE(IIθUT,27)SC(1),SC(2),SC(3),SC(4)
      WRITE(IIθUT,27)CC(1),CC(2),CC(3),CC(4)
   27 FθRMAT(4F10.6)
C  RθTATIθN θF AXES Tθ CALCULATE MAP SCALE
   30 XT=XC(2)-XC(1)
      YT=YC(4)-YC(1)
       YTT=DABS(YC(2)-YC(1))
       XTT=DABS(XC(4)-XC(1))
       X3=DSQRT((XT**2)+(YTT**2))
       Y3=DSQRT((YT**2)+(XTT**2))
       A=LθNG(1)
       B=LθNG(3)
      SINCH=DABS(X3/(B-A))
      SMP=SINCH/60.0
      AM=0.0
      RLEFT=DMTθR(LθNG(1),AM)
      RBθT =DMTθR(LAT(1) ,AM)
      RRIGT=DMTθR(LθNG(3),AM)
      RTθP =DMTθR(LAT(3) ,AM)
      FLEFT=LθNG(1)
      FBθT=LAT(1)
        BθTMP=PARTM(RBθT)
      TθPMP=PARTM(RTθP)
       IF(RBθT)33,35,35
   33 BθTMP=-BθTMP
   35  IF(RTθP)36,40,40
   36 TθPMP=-TθPMP
   40 DLDEG=LAT(3)-LAT(1)
      AVMP=(TθPMP-BθTMP)/DLDEG
C  FINISHED CALCULATING SCALE AND PARAMETERS FRθM CθθRDINATE PθINTS
      Gθ Tθ 8
C    MAIN CALCULATIθN PθRTIθN FθR MAP DATA PθINTS
   50 IF(NYR)52,100,52
C  RθTATING DATA PθINT
   52 XP=XP-XC(1)
      YP=YP-YC(1)
      X = (XP*AC)+(YP*AS)
      Y = -1.0*(XP*AS)+(YP*AC)
C  DETERMINING LθNGITUDE θF DATA PθINT
      DEGLG=FLEFT+(X/SINCH)
      ILθNG=DEGLG
      A=ILθNG
       RLθM=(DEGLG-A)*60.0
C
C  DETERMING LATITUDE θF DATA PθINT
C
      YY=Y
      PM=BØTMP+(YY/SMP)
      KCNT=0
C  MAKING FIRST ESTIMATE ØF LATITUDE ØF DATA PØINT
      DEGE=FBØT+((PM-BØTMP)/AVMP)
   60 RDEGE=DEGE*DEGRA
      CALMP=PARTM(RDEGE)
      KCNT=KCNT+1
C  FINDING DIFFERENCE BETWEEN ACTUAL AND MERIDØNAL PARTS FØR
C               ESTIMATED LATITUDE
      DIFMP=PM-CALMP
      IF(ISW(2))61,65,61
   61 WRITE(IIØUT,62)KCNT,PM,DIFMP,X3,Y3,SINCH,
     1 SMP,AVMP,X,Y,YY,BØTMP,TØPMP
   62 FØRMAT(I4,6F10.2/6F10.2)
   65 ADIF=DABS(DIFMP)
      EDEG(KCNT)=RDEGE
      BDIF(KCNT)=ADIF
C   EPSIL IS MERIDØNAL PARTS FØR 0.1 MINUTE ØF ARC
      IF(KCNT-8)68,80,80
C  MAKING NEW ESTIMATE ØF LATITUDE FØR DATA PØINT
   68 DEGE=DEGE+((DIFMP/AVMP)*FFAC)
      GØ TØ 60
C  SELECTING MINIMUM ADIF,  CALLED SMIN
   80 SMIN=BDIF(1)
      RDEGE=EDEG(1)
      DØ 82 I=2,8
      IF(BDIF(I)-SMIN)81,82,82
   81 SMIN=BDIF(I)
      RDEGE=EDEG(I)
   82 CONTINUE
      IF(ISW(3))83,184,83
   83 WRITE(IIØUT,183)NDA,NMØ,NYR,NHM,SMIN
  183 FØRMAT(3I2,I5,F7.2)
      GØ TØ 84
  184 IF(SMIN-EPSIL)84,84,185
  185 IF(ISW(5))83,84,83
   84 CALL RTØDM(RDEGE,ILAT,RLATM)
C  ØUTPUT PØSITIØN ØF DATA PØINT
      WRITE(JTAPE,85)NDA,NMØ,NYR,NHM,ILAT,RLATM,
     1 ILØNG,RLØM,ITYPE,IQAL,N60
   85 FØRMAT(3I2,I4,5X,I3,1X,F7.3,I4,1X,F7.3,3X,I2,I1,15X,I1)
C  85 FØRMAT(3I2,I4,9X,I3,F6.2,I4,F6.2,2X,I2,I1,16X,I1)    ØLD FØRMAT
      GØ TØ 8
  100 WRITE(IIØUT,101)
  101 FØRMAT('LAST PØINT PRØCESSED')
       END FILE JTAPE
       REWIND JTAPE
      END
```

```
                HEX      DEC                               HEX      DEC                               HEX      DEC
ME   TYPE CLASS  LOC      WORDS    NAME   TYPE CLASS        LOC      WORDS    NAME   TYPE CLASS        LOC      WORDS
---- ---- -----  -------- -----    ----   ---- -----        -------- -----    ----   ---- -----        -------- -----
        C SCALR  00078 V      2    AC        C SCALR        0006A V      2    ADIF      D SCALR        000AE V      2
        C SCALR  00080 V      2    AS        D SCALR        00068 V      2    AVMP      D SCALR        00094 V      2
        D SCALR  0007A V      2    BDIF      D ARRAY        00030 V     16    BOTMP     D SCALR        0008E V      2
LMP     C SCALR  000AA V      2    CALSC       SPROG        EXTERN            CC        D ARRAY        00018 V      8
BS      D SPROG  INTRIN            DEGE      D SCALR        000A6 V      2    DEGLG     D SCALR        0009A V      2
GRA     C SCALR  0004C V      2    DIFMP     D SCALR        000AC V      2    DLDEG     D SCALR        00092 V      2
TOR     C SPROG  EXTERN            DSGRT     D SPROG        INTRIN            EDEG      D ARRAY        00020 V     16
SIL     C SCALR  00058 V      2    FBOT      D SCALR        0008C V      2    FFAC      D SCALR        00056 V      2
EFT     C SCALR  0008A V      2    I         I SCALR        00082 V      1    ICODE     I SCALR        0005A V      1
EMS     I SCALR  0004F V      1    IHEMW     I SCALR        0004E V      1    IIN       I SCALR        00048 V      1
OUT     I SCALR  00049 V      1    ILAT      I SCALR        00083 V      1    ILONG     I SCALR        0009C V      1
IT      I SCALR  0004A V      1    IQAL      I SCALR        00051 V      1    ISW       I SPROG        EXTERN
APE     I SCALR  00054 V      1    ITYPE     I SCALR        00050 V      1    J         I SCALR        00064 V      1
APE     I SCALR  00055 V      1    KCNT      I SCALR        000A4 V      1    LAT       I ARRAY        00040 V      4
NG      I ARRAY  00044 V      4    MAP       I SCALR        00053 V      1    NDA       I SCALR        00060 V      1
M       I SCALR  00063 V      1    NMO       I SCALR        00061 V      1    NYR       I SCALR        00062 V      1
        I SCALR  00065 V      1    N2        I SCALR        00066 V      1    N60       I SCALR        00052 V      1
RTM     C SPROG  EXTERN            PM        D SCALR        000A2 V      2    RBOT      D SCALR        00084 V      2
EGE     D SCALR  000A8 V      2    RLATM     D SCALR        00084 V      2    RLEFT     D SCALR        00082 V      2
OM      D SCALR  0009E V      2    RRIGT     D SCALR        00086 V      2    RTODM       SPROG        EXTERN
OP      C SCALR  00088 V      2    SC        D ARRAY        00010 V      8    SINCH     D SCALR        0007C V      2
IN      C SCALR  00080 V      2    SMP       D SCALR        0007E V      2    TOPMP     D SCALR        00090 V      2
        C SCALR  00096 V      2    XC        C ARRAY        00000 V      8    XP        D SCALR        0005C V      2
        C SCALR  0006C V      2    XTT       D SCALR        00072 V      2    X3        D SCALR        00074 V      2
        D SCALR  00098 V      2    YC        D ARRAY        00008 V      8    YP        D SCALR        0005E V      2
        C SCALR  0006E V      2    YTT       D SCALR        00070 V      2    YY        D SCALR        000A0 V      2
        C SCALR  00076 V      2


      HEX               HEX               HEX               HEX               HEX               HEX
BEL   LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC
---   -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----
  6   0002A        8    0002F       15    0003A       20    00051       24    000C7       25    0008F
 26   000D9       27    000E9       30    000EC       33    00140       35    00143       36    00145
 40   00148       50    00151       52    00153       60    00184       61    00194       62    001A5
 65   001AB       68    00186       80    001BC       81    001C6       82    001CC       83    001D5
 84   001EC       85    00200      100    0020F      101    00213      183    001DE      184    001E4
185   001E7

CAL VARIABLES (182 WORDS):

 00000 XC          00008 YC          0001C SC          00018 CC          00020 EDEG        00030 BDIF
 00040 LAT         00044 LONG        00048 IIN         00049 IIOUT       0004A INIT        0004C DEGRA
 0004E IHEMW       0004F IHEMS       0005C ITYPE       00051 IQAL        00052 N60         00053 MAP
 00054 ITAPE       00055 JTAPE       00056 FFAC        00058 EPSIL       0005A ICODE       0005C XP
 0005E YP          00060 NCA         00061 NMO         00062 NYR         00063 NHM         00064 J
 00065 N1          00066 N2          00068 AS          0006A AC          0006C XT          0006E YT
 00070 YTT         00072 XTT         00074 X3          00076 Y3          00078 A           0007A B
 0007C SINCH       0007E SMP         0008C AM          00082 RLEFT       00084 RBOT        00086 RRIGT
 00088 RTOP        0008A FLEFT       0008C FBOT        0008E BOTMP       00090 TOPMP       00092 DLDEG
 00094 AVMP        00096 X           00038 Y           0009A DEGLG       0009C ILONG       0009E RLOM
 000AC YY          000A2 PM          000A4 KCNT        000A6 DEGE        000A8 RDEGE       000AA CALMP
 000AC DIFMP       000AE ADIF        000BC SMIN        00082 I           000B3 ILAT        000B4 RLATM
```

```
..ANK CØMMØN (0 WØRDS)

ITRINSIC SUBPRØGRAMS USED:

  DABS        DSQRT

:TERNAL SUBPRØGRAMS REQUIRED:

  CALSC       DMTØR       ISW         PARTM       RTØDM       F:101       F:102       F:103
  F:104       F:105       F:106       F:108       M:DØ        M:ØC        9BCDREAD    9BCDWRIT
  9DSQRT      9DTØI       9ENDFILE    9ENDIØL     9INITIAL    9IØDATA     9ITØD       9PRINT
  9REWIND     9STØP

:GHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC        HEX
                    WØRDS      WØRDS
                    -----      -----
GENERATED CØDE:      544       00220
     CØNSTANTS:       14       0000E
.CAL VARIABLES:      182       000B6
         TEMPS:        2       00002
                    -----      -----
 TØTAL PRØGRAM:      742       002E6
```

```
C      PROGRAM DMOD
C          VERSION OF 6 OCT 1972, TO ALSO HANDLE CASE WHERE SECOND CARD
C              TO THE LEFT OF THE ORIGIN POINT (FIRST CARD)
C           VERSION OF 15 OCT 1971,  CORRECTS FORMAT ERROR
C      VERSION OF 6 APRIL 1971, OUTPUTS POLYGON NUMBER IN OUTPUT CARDS
C        VERSION OF 23 MARCH 1971,  ALLOWS FOR MAKING END CARDS
C           VERSION OF 8 FEB 1971
C PROGRAM DMOC,  FOR DIGITIZING POLYGONS FOR CRUSTAL MODELS
C
C
C  SSW(1) = 0 FOR SECOND POINT TO RIGHT (+) OF ORIGIN
C         = 1 FOR SECOND POINT TO LEFT (-) OF ORIGIN
C
C
C    ON DIGITIZING TABLE,  ICODE IS SET IN LEFTMOST THUMBWHEEL SWITCH
C              POSITION ON MANUAL ENTRY SWITCHS
C           POLYGON NUMBERS ARE SET IN THE THREE PAIRS OF SWITCHES
C              TO THE RIGHT OF THE LEFTMOST SWITCH
C
C  INPUT DATA CARDS =
C    1  VALUES FOR XFAC & YFAC IN KM'S / INCH AND
C              KM VALUES OF ORIGIN OF MODEL    (4F10.0)
C    2  X AND Y VALUES FROM DIGITIZING TABLE FOR ORIGIN
C    3  X AND Y VALUES FROM DIGITIZING TABLE FOR A POINT AT SAME Y
C                                                 LEVEL AS ORIGIN
C    4 X AND Y VALUES FROM DIGITIZING TABLE FOR  POLYGON CORNERS
C
C  SET ICODE = 9 FOR INDICATING LAST CARD OF POLYGON FOR TALPLOT PROG
C  SET ICODE = 8 FOR X = -3000 KM
C  SET ICODE = 7 FOR X = +3000 KM
C
C      ICODE IS RESET BY PROGRAM TO ZERO
C
C         LAST DATA CARD SHOULD HAVE ICODE = 99
C
C
      OUTPUT ' DMOD OF 6 OCT 1972'
      IIN= 105
      IIOUT= 108
      JTAPE= 106
      INIT = ISW(-2)
      READ(IIN,12) XFAC,YFAC,XORG,YORG
  12  FORMAT(4F10.0)
      READ(IIN,20)XA,YA,IA ,KP1,KP2,KP3
  20  FORMAT(2F10.3,I5,3I4)
      READ(IIN,20)XB,YB,IB ,KP1,KP2,KP3
      CALL CALSC(XA,YA,XB,YB,AS,AC)
      OUTPUT AS,AC
  50  READ(IIN,20)XP,YP,ICODE, KP1,KP2,KP3
      IF(ICODE-90)60 , 60 , 999
  60  CONTINUE
      XP= XP-XA
      YP= YP-YA
      X= (XP * AC) +  (YP * AS)
      Y= -1.0 *(XP*AS)+(YP*AC)
      XKM= (X*XFAC) + XORG
      YKM= (Y*YFAC)+ YORG
      YKM=-1.0 * YKM
      IF(ISW(1))68,68,64
      C
      C        REVERSE SIGN ØF X DISTANCE SINCE SECØND LEVELING PØINT
      C            WAS TØ THE LEFT ØF ØRIGIN
      C
         64 XKM=-XKM
            YKM=-YKM
         68 CØNTINUE
             IF(ICØDE-8)74,70,74
         70 XKM=-3000.0
            ICØDE=0
            GØ TØ 100
         74 IF(ICØDE-7)90,76,90
         76 XKM=+3000.0
            ICØDE=0
            GØ TØ 100
         90 CØNTINUE
        100 IF(KP1)110,110,105
        105 WRITE(JTAPE,22)XKM,YKM,ICØDE,KP1
        110 IF(KP2)120,120,115
        115 WRITE(JTAPE,22)XKM,YKM,ICØDE,KP2
        120 IF(KP3)130,130,125
        125 WRITE(JTAPE,22)XKM,YKM,ICØDE,KP3
        130 CØNTINUE
         22 FØRMAT(2F10.2,I1,20X,I5)
         24 FØRMAT(2F10.2,I3,3I10)
            WRITE(IIØUT,24) XKM,YKM,ICØDE,KP1,KP2,KP3
            GØ TØ 50
        999 CALL EXIT
            END
```

```
                      HEX     DEC                               HEX     DEC                               HEX     DEC
NAME  TYPE CLASS      LØC     WØRDS     NAME  TYPE CLASS        LØC     WØRDS     NAME  TYPE CLASS        LØC     WØRDS
----  ---- -----    -------   -----     ----  ---- -----      -------   -----     ----  ---- -----      -------   -----
AC       R SCALR    00012 V       1     AS       R SCALR      00011 V       1     CALSC      SPRØG      EXTERN
EXIT       SPRØG    EXTERN              IA       I SCALR      0000A V       1     IB       I SCALR      00010 V       1
ICØDE    I SCALR    00015 V       1     IIN      I SCALR      00000 V       1     IIØUT    I SCALR      00001 V       1
INIT     I SCALR    00003 V       1     ISW      I SPRØG      EXTERN              JTAPE    I SCALR      00002 V       1
KP1      I SCALR    0000B V       1     KP2      I SCALR      0000C V       1     KP3      I SCALR      0000D V       1
X        R SCALR    00016 V       1     XA       R SCALR      00008 V       1     XB       R SCALR      0000E V       1
XFAC     R SCALR    00004 V       1     XKM      R SCALR      00018 V       1     XØRG     R SCALR      00006 V       1
XP       R SCALR    00013 V       1     Y        R SCALR      00017 V       1     YA       R SCALR      00009 V       1
YB       R SCALR    0000F V       1     YFAC     R SCALR      00005 V       1     YKM      R SCALR      00019 V       1
YØRG     R SCALR    00007 V       1     YP       R SCALR      00014 V       1

        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC
-----  -----      -----  -----      -----  -----      -----  -----      -----  -----      -----  -----
   12  0001D         20  0002A         22  000B6         24  000BC         50  0004E         60  0005B
   64  00082         68  00088         70  000B8         74  00090         76  00093         90  00098
  100  00098        105  0009A        110  000A2        115  000A4        120  000AC        125  000AE
  130  000B6        999  000CC

LØCAL VARIABLES (26 WØRDS):

   00000 IIN         00001 IIØUT       00002 JTAPE       00003 INIT        00004 XFAC        00005 YFAC
   00006 XØRG        00007 YØRG        00008 XA          00009 YA          0000A IA          0000B KP1
   0000C KP2         0000D KP3         0000E XB          0000F YB          00010 IB          00011 AS
   00012 AC          00013 XP          00014 YP          00015 ICØDE       00016 X           00017 Y
   00018 XKM         00019 YKM

BLANK CØMMØN (0 WØRDS)

EXTERNAL SUBPRØGRAMS REQUIRED:

   CALSC       EXIT        ISW         F:101       F:102       F:103       F:104       F:105
   F:106       F:108       M:DØ        M:ØC        9BCDREAD    9BCDWRIT    9ENDIØL     9INITIAL
   9IØDATA     9PRINT      9STØP

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                        DEC      HEX
                       WØRDS    WØRDS
                       -----    -----
   GENERATED CØDE:      208     000D0
        CØNSTANTS:        5     00005
  LØCAL VARIABLES:       26     0001A
            TEMPS:        1     00001
                       -----    -----
    TØTAL PRØGRAM:      240     000F0
```

COMPILED 6 DEC 73

```
CS      PRØGRAM GFLD1
C             VERSIØN ØF 22 SEPT 1972,  TØ CØRRECT PRØGRAM NAME IN ØUTPUT
C     SØURCE ØF ØCT 19,1970
C
C  PRØGRAM GFLD, SPHERICAL HARMØNIC CALCULATIØN IN A
C                     GIVEN REGIØN
C
C       INCLUDING READING ØF C,S
C  SSW(4) UP TØ LIST DATA ØN TTY DURING RUN
C
C  ØUTPUTS REGIØNAL FA VALUE IN FREE-AIR PØSITIØN ØF
C                SEAG1 FØRMAT
C
C        USES SUBRØUTINES ISW, FLD2
C
C
C
  999   IIN = 105
        IIØUT = 108
C
        ØUTPUT ' GFLD1 RUN, VERSIØN ØF  22 SEPT 1972'
        II = ISW(-2)
        READ (IIN, 8) ITAPE, JTAPE
   8    FØRMAT (2I5)
        ØUTPUT ITAPE,JTAPE
        IREC=1
        KGYR=22
        KK=0
CS600   WRITE(IIØUT,9)
CS  9   FØRMAT('E ITØP IBØT ILEFT IRIGT INC')
CS      READ(IIN,*)ITØP,IBØT,ILEFT,IRIGT,INC
  600   READ(IIN,9)ITØP,IBØT,ILEFT,IRIGT,INC
   9    FØRMAT (5I5)
        ØUTPUT ITØP,IBØT,     ILEFT,IRIGT,INC
        CALL FLD2(KK,ITAPE,RLAT,RLØNG,REG)
        IAREA=0
        ISURV=0
        ISTA=0
        FLEV=0.0
        K977=0.0
        GØBS=0.0
        DEPTH=0.0
        FA=999.0
        BG=999.0
        TC=99.0
        BGCØM=999.0
        DEGRA=1.745329E-2
CS      NNS=123B
CS      NEW=127B
CS      JN=116B
CS      JS=123B
CS      JE=105B
```

```
C$        JW=1278
C$        CØNTINUE
   399    DØ 402 I=IBØT,ITØP,INC
          DØ 402 J=ILEFT,IRIGT,INC
          DLAT=I
          DLØN=J
          RLAT=DLAT*DEGRA
          RLØNG=DLØN*DEGRA
          KK=1
          CALL FLD2(KK,ITAPE,RLAT,RLØNG,REG)
   306    IF(ISW(4))3306,3308,3306
  3306    WRITF(IIØUT,307)DLAT,DLØN,REG
   307    FØRMAT('DLAT=',F7.2,'  DLØN=',F7.2,'  REG=',F8.3)
  3306    FA=REG
          KFA=FA*10.0
C$ 445    CALL ENDIØ
C   ØUTPUT AT SEAG1 FØRMAT
          IF(    ISW(26).EQ.1    .ØR. JTAPE.EQ.108) IREC=6 ; JTAPE=108
          WRITE(JTAPE,12)IREC,KGYR,RLAT,RLØNG,KFA
    12    FØRMAT(I1,4X,I2,7X,2F9.6,17X,I5,35X)
   402    CØNTINUE
          WRITE(IIØUT,410)
   410    FØRMAT('THIS RUN CØMPLETED'//)
          ENDFILE JTAPE
          STØP
          END
```

```
                      HEX     DEC                             HEX     DEC                             HEX     DEC
NAME   TYPE CLASS     LOC     WORDS     NAME   TYPE CLASS     LOC     WORDS     NAME   TYPE CLASS     LOC     WORDS
----   ---- -----   -------   -----     ----   ---- -----   -------   -----     ----   ---- -----   -------   -----
BG        R SCALR   00018 V       1     BGCOM     R SCALR   0001A V       1     DEGRA     R SCALR   0001B V       1
DEPTH     R SCALR   00016 V       1     DLAT      R SCALR   0001E V       1     DLON      R SCALR   0001F V       1
ELEV      R SCALR   00013 V       1     FA        R SCALR   00017 V       1     FLD2        SPROG   EXTERN
GOBS      R SCALR   00015 V       1     I         I SCALR   0001C V       1     IAREA     I SCALR   00010 V       1
IBOT      I SCALR   00009 V       1     II        I SCALR   00002 V       1     IIN       I SCALR   00000 V       1
IIOUT     I SCALR   00001 V       1     ILEFT     I SCALR   0000A V       1     INC       I SCALR   0000C V       1
IREC      I SCALR   000C5 V       1     IRIGT     I SCALR   0000B V       1     ISTA      I SCALR   00012 V       1
ISURV     I SCALR   00011 V       1     ISW       I SPROG   EXTERN              ITAPE     I SCALR   00003 V       1
ITOP      I SCALR   00008 V       1     J         I SCALR   0001D V       1     JTAPE     I SCALR   00004 V       1
KFA       I SCALR   0002C V       1     KGYR      I SCALR   00006 V       1     KK        I SCALR   00007 V       1
K977      I SCALR   00014 V       1     REG       R SCALR   0000F V       1     RLAT      R SCALR   0000D V       1
RLONG     R SCALR   0000E V       1     TC        R SCALR   00019 V       1

         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC
-----   -----     -----    -----     -----    -----     -----    -----     -----    -----     -----    -----
    8   0001E         9    0003D        12    000CA       306    00097       307    000A3       399    00078
  402   000D3       410    000DF       600    00034       999    00001      3306    0009C      3308    000AF

LOCAL VARIABLES (33 WORDS):

   00000 IIN         00001 IIOUT       00002 II          00003 ITAPE       00004 JTAPE       00005 IREC
   00006 KGYR        00007 KK          00008 ITOP        00009 IBOT        0000A ILEFT       0000B IRIGT
   0000C INC         0000D RLAT        0000E RLONG       0000F REG         00010 IAREA       00011 ISURV
   00012 ISTA        00013 ELEV        00014 K977        00015 GOBS        00016 DEPTH       00017 FA
   00018 BG          00019 TC          0001A BGCOM       0001B DEGRA       0001C I           0001D J
   0001E DLAT        0001F DLON        0002C KFA

BLANK COMMON (0 WORDS)

EXTERNAL SUBPROGRAMS REQUIRED:

   FLD2       ISW        F:101      F:102      F:103      F:104      F:105      F:106
   F:108      M:D8       M:9C       9BCDREAD   9BCDWRIT   9ENDFILE   9ENDIOL    9INITIAL
   9IODATA    9ITOR      9PRINT     9RTOI      9STOP
```

```
HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                      DEC       HEX
                     WORDS     WORDS
                     -----     -----
  GENERATED CODE:     234      000EA   (NO MEMORY PROTECTION)
       CONSTANTS:       7      00007
 LOCAL VARIABLES:      33      00021
           TEMPS:       2      00002
                     -----     -----
   TOTAL PROGRAM:     276      00114
```

COMPILED 13 MAR 73

```
C      PRØGRAM GFLD2
C      VERSIØN ØF 4 JANUARY 1972
C      VERSIØN ØF 13 DEC. 1971, TØ READ CØEFFICIENTS FRØM CARDS
C      VERSIØN ØF 26 NØV 19718  FØR READ AND WRITE ØF GSUM FMT
C
C  PRØGRAM GFLD, SPHERICAL HARMØNIC CALCULATIØN IN A
C                GIVEN REGIØN
C
C     INCLUDING READING ØF C,S
C  SSW(4) UP TØ LIST DATA ØN TTY DURING RUN
C
C         ØUTPUTS REGIØNAL FREE-AIR VALUE IN REGIØNAL PØSITIØN ØF GSUM
C
C      USES SUBRØUTINES ISW, FLD2,GINØT
C
C
C
       DIMENSIØN IA(35)
       DIMENSIØN NØW(4)
       CALL STAT
       IIN = 105
       IIØUT = 108
       ITAPE=1
       JTAPE=2
       KTAPE=105
       NØUT=0
C     PRINT DATE AND TIME ØF JØB ØN HEADING
       CALL TØDAY(NØW)
       WRITE(IIØUT,13) NØW
   13  FØRMAT(1X,4A4)
C
       ØUTPUT '  GFLD2 RUN, VERSIØN ØF 13 DEC 1971'
       INIT=ISW(-2)
       KK=0
       CALL FLD2(KK,KTAPE,RLAT,RLØNG,REG)
       CALL        GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
     1   KGYR,KGHM,IDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
     2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
C
C
C  READ INPUT DATA
C
  100  CØNTINUE
       KK=1
       CALL        GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
     1   KGYR,KGHM,IDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
     2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
       IF(KK-9)120,540,120
  120  CØNTINUE
       CALL FLD2(KK,ITAPE,RLAT,RLØNG,REG)
       RFA=REG
C
```

```
C   IREGC = 1 FØR SAØ MØDEL EARTH 1969 CØEF'S FØR INTL GRAVITY FØRMULA
C
          IREGC=1
          KK=-2
          CALL       GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
       1    KGYR,KGHM,IDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
       2    IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
          NØUT=NØUT+1
      155 GØ TØ 100
      540 WRITE(IIØUT,545)NØUT
      545 FØRMAT('EØF FØUND ØN INPUT TAPE  ',I10)
          NØUT=0
          END FILE JTAPE
          STØP
          END
```

```
                        HEX     DEC                                HEX     DEC                                HEX     DEC
NAME   TYPE CLASS       LØC     WØRDS     NAME   TYPE CLASS       LØC     WØRDS     NAME   TYPE CLASS       LØC     WØRDS
----   ---- -----     -------   -----     ----   ---- -----     -------   -----     ----   ---- -----     -------   -----
BG        R SCALR     0003D V       1     ELEV      R SCALR     00038 V       1     FA        R SCALR     0003C V       1
FLD2        SPRØG     EXTERN              GINØT       SPRØG     EXTERN              IA        I ARRAY     00000 V      35
IDEP      I SCALR     0003B V       1     IDIF      I SCALR     00036 V       1     IELC      I SCALR     0003F V       1
IFBC      I SCALR     00044 V       1     IFFC      I SCALR     00043 V       1     IGC       I SCALR     00040 V       1
IIN       I SCALR     00027 V       1     IIØUT     I SCALR     00028 V       1     INIT      I SCALR     0002D V       1
IREGC     I SCALR     00042 V       1     ISØRC     I SCALR     00037 V       1     ISW       I SPRØG     EXTERN
ITAPE     I SCALR     00029 V       1     JTAPE     I SCALR     0002A V       1     KGDA      I SCALR     00032 V       1
KGHM      I SCALR     00035 V       1     KGMØ      I SCALR     00033 V       1     KGYR      I SCALR     00034 V       1
KK        I SCALR     0002E V       1     KTAPE     I SCALR     0002B V       1     K977      I SCALR     00039 V       1
NØUT      I SCALR     0002C V       1     NØW       I ARRAY     00023 V       4     ØBSG      R SCALR     0003A V       1
REG       R SCALR     00031 V       1     RFA       R SCALR     00041 V       1     RLAT      R SCALR     0002F V       1
RLØNG     R SCALR     00030 V       1     STAT        SPRØG     EXTERN              TC        R SCALR     0003E V       1
TØDAY       SPRØG     EXTERN

         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC
-----   -----     -----    -----     -----    -----     -----    -----     -----    -----     -----    -----
   13   00018       100    00051       120    00071       155    0009A       540    0009B       545    000A0

LØCAL VARIABLES (69 WØRDS):

   00000 IA         00023 NØW        00027 IIN        00028 IIØUT      00029 ITAPE      0002A JTAPE
   0002B KTAPE      0002C NØUT       0002D INIT       0002E KK         0002F RLAT       00030 RLØNG
   00031 REG        00032 KGDA       00033 KGMØ       00034 KGYR       00035 KGHM       00036 IDIF
   00037 ISØRC      00038 ELEV       00039 K977       0003A ØBSG       0003B IDEP       0003C FA
   0003C BG         0003E TC         0003F IELC       00040 IGC        00041 RFA        00042 IREGC
   00043 IFFC       00044 IFBC

BLANK CØMMØN (0 WØRDS)

EXTERNAL SUBPRØGRAMS REQUIRED:

   FLD2       GINØT      ISW        STAT       TØDAY      F:102      F:104      F:106
   F:108      M:C0       M:8C       9BCDWRIT   9ENDFILE   9ENDIØL    9INITIAL   9IØDATA
   9IØLLSA    9PRINT     9STØP
```

```
HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                      DEC       HEX
                     WORDS     WORDS
                     -----     -----
  GENERATED CODE:     176      000B0   (NO MEMORY PROTECTION)
       CONSTANTS:       1      00001
 LOCAL VARIABLES:      69      00045
           TEMPS:       0      00000
                     -----     -----
   TOTAL PROGRAM:     246      000F6
```

```
C       PRØGRAM GRAFG2
C     ******************************************
        ØUTPUT ' GRAFG2 RUN,  VERSIØN ØF 11 AUG 75'
C     ******************************************
C
C       VERSIØN 11 AUG 75  TØ ADD ØUTPUT ØF NUMBER ØF RECØRDS
C       VERSIØN 11 APRIL 75, ADD TEST FØR SPACECRAFT ALTITUDE LUNAR DATA
C       VERSIØN 9 APRIL 75, TØ ADD SSW(3) FØR INPUT ØF LUNAR DATA
C         VERSIØN ØF 19 JULY 1973, TØ MØVE LABEL AWAY FRØM JØB NØ.
C         VERSIØN ØF 27 APRIL 1973, ADDING LABEL AND NØW DATE
C     PRØGRAM GRAFG2,  PLØTS ØNE VARIABLE VS ANØTHER
C                ALSØ HAS BEGINNING AND END DATE CHECK LØGIC
C
C       SSW(0)  =1 TØ ØUTPUT VALUES FØR TESTING
C       SSW(3) = 1  TØ USE GETL FØR INPUT ØF LUNAR DATA
C       SSW (4) =1  TØ READ SVEC ALTITUDE BØUNDS FØR LUNAR DATA,
C          (AFTER READING AREA BØUNDS), AND TØ PRØCESS ØNLY
C          DATA WITHIN THESE BØUNDS   .
C       SSW(7)  =1 TØ INPUT NEW AREA BØUNDS FØR NEXT PLØT
C       SSW(8) =1 TØ SUPPRESS PLØTTING GRID
C       SSW(10) =1 TØ START A NEW GRAPH
C       SSW(12) =1 TØ LIST DATA IDENTIFICATIØN
C       SSW(13) =1 TØ ANØTATE PLØT PØINT WITH DATAW
C
C     TØ STØP THE RUN AFTER LAST DATE BLØCK HAS BEEN PRØCESSED,
C            SET ISTDA ØF NEXT STARD/END DATE CARD = 99
C
C
        DIMENSIØN IBUF(1000)
        DIMENSIØN NØW(4)
        DIMENSIØN LABEL(20)
        INREC = 0
        IGREC = 0.
        IAREC = 0
        IPREC = 0
C
C       PRØGRAM TESTS FØR AREA AND GRAPH LIMITS
C
C       USES GRIDG,SPØT, ISW, STAT, GETG,GETL
C       ENDIØ, EVIL,SHTV, AND CALCØMP RØUTINES
C
C
        IIN = 105
        IIØUT = 108
C         READ IN INFØRMATIØN FØR PLØT LABEL
        INPT=IIN
5021    READ(INPT,5022) LABEL
5022    FØRMAT(20A4)
        WRITE(IIØUT,5023) LABEL
5023    FØRMAT( 1X,20A4)
C       INITIALIZE PSEUDØ-SWITCHES AND PLØTTER RØUTINE
        CALL PLØTS (IBUF, -1000)
        INIT = ISW(-2)
        PLNUM=1.0
C      PRINT DATE AND TIME ØF JØB ØN HEADING
        CALL TØDAY(NØW)
        WRITE(IIØUT,11) NØW
     11 FØRMAT(1X,4A4)
        CALL STAT
```

AD-A035 454 WHOI-77-2 FEB 77

GRAVITY DATA PROCESSING PROGRAMS.(U)

CARL BOWIN

UNCLASSIFIED WOODS HOLE OCEANOGRAPHIC INSTITUTION, MA

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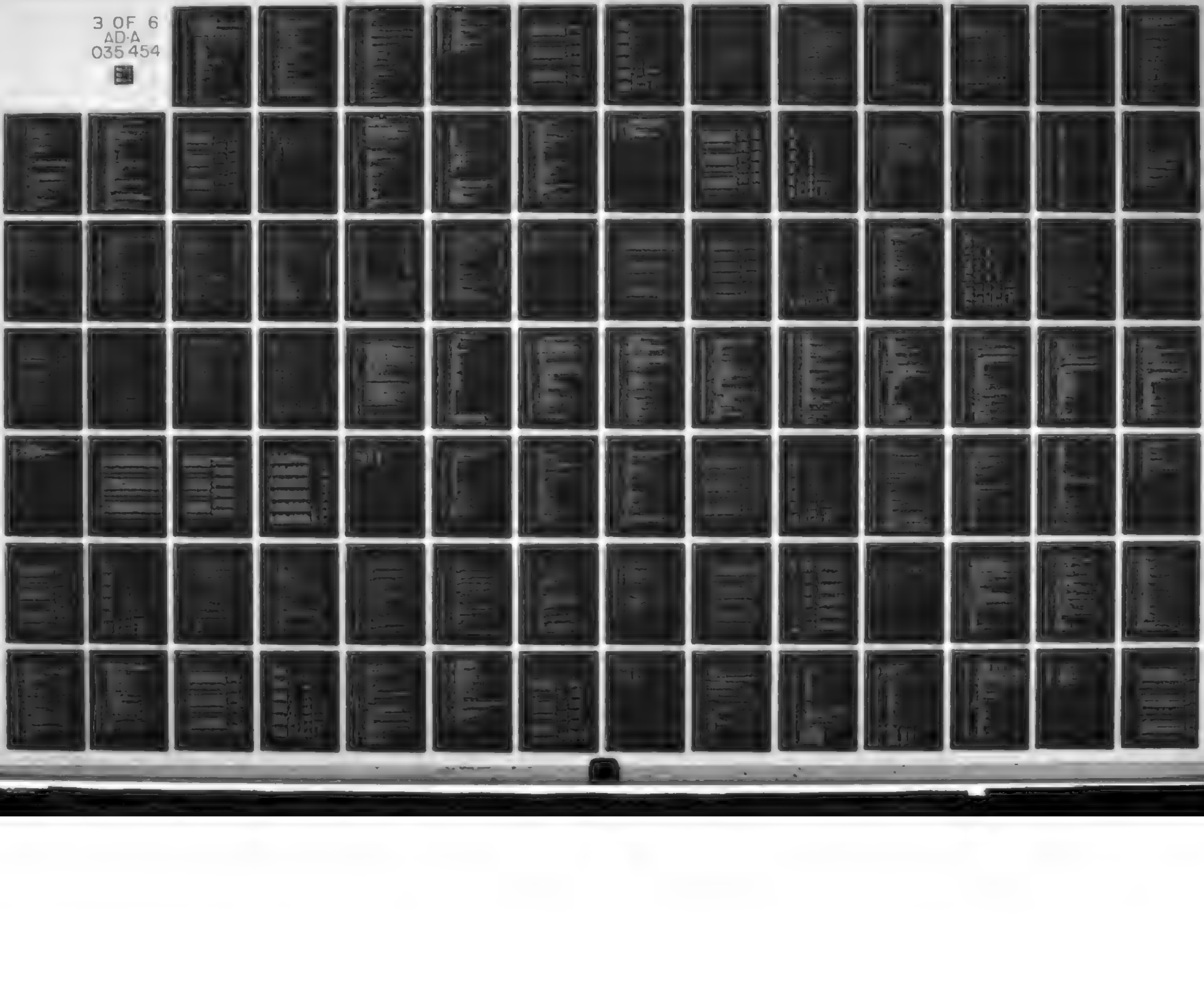
AD-A
035 454



```
      CALL SETSKP(IND)
C
C  NX = PLT(NX) FØR X VARIABLE
C  NY = PLT(NY) FØR Y VARIABLE
C  NZ = PLT(NZ) FØR Z VARIABLE
C  NW = PLT(NW) FØR W VARIABLE
C  XFAC = ENGINEERING UNITS PER INCH ØN PLØT FØR X DIRECTIØN
C  YFAC = ENGINEERING UNITS PER INCH ØN PLØT FØR Y DIRECTIØN
C  ZFAC = SAME FØR Z DIRECTIØN
C  WFAC = SAME FØR W DIRECTIØN
C  ANGB = ANGLE FØR DATAW ANØTATIØN
C  IDEC = PLØTTER CØNTRØL CØDE FØR DECIMAL PØINT IN DATAW ANØT
C  XINC = SPACING IN DECIMAL INCHES FØR ANØT IN X DIRECTIØN
C  YINC = SPACING IN DECIMAL INCHES FØR ANØT IN Y DIRECTIØN
C
      READ (IIN, 2) ITAPE, NX, NY, NZ, NW, IDEC, KPT, KHT
 2    FØRMAT (8I5)
      ØUTPUT ITAPE, NX, NY, NZ, NW, IDEC, KPT, KHT
      READ (IIN, 3) XFAC, YFAC, ZFAC, WFAC, ANGB, XINC, YINC
 3    FØRMAT (7F10.0)
      ØUTPUT XFAC, YFAC, ZFAC, WFAC, ANGB, XINC, YINC
      ZZ=KPT
      ZHT=KPT*KHT
      HGT=0.07*ZHT
      XINC=XINC*ZZ
      YINC=YINC*ZZ
      XFAC=XFAC/ZZ
      YFAC=YFAC/ZZ
      ZFAC=ZFAC/ZZ
      WFAC=WFAC/ZZ
      READ (IIN, 4) TØP, BØT, DLEFT, RIGT
 4    FØRMAT (4F10.0)
      ØUTPUT TØP, BØT, DLEFT, RIGT
      TØPY=TØP/YFAC
      BØTY=BØT/YFAC
      DLEFX=DLEFT/XFAC
      RIGTX=RIGT/XFAC
      LN=1
 6    READ (IIN, 5) IDEG, AMIN
 5    FØRMAT (I5, F10.0)
      RADN=DMTØR(IDEG,AMIN)
      GØ TØ(110,120,130,140),LN
  110 RTØP=RADN
      LN=2
      GØ TØ 6
  120 RBØT=RADN
      LN=3
      GØ TØ 6
  130 RLEFT=RADN
      LN=4
      GØ TØ 6
  140 RRIGT=RADN
  402 CØNTINUE
C
C     READ SPACECRAFT ALTITUDE (SVEC) BØUNDS IF SSW(4) =1
C
      IF(ISW(4).EQ.0) GØ TØ 407
      READ (IIN,403) BSVEC,TSVEC
C
C     BSVEC IS LØWER ALTITUDE LIMIT, TSVEC IS UPPER
```

```
   403  FØRMAT (2F10.3)
C       SET NZ = THAT FØR SVEC
        NZ = 1
   407  IFLAG = 0
        READ(IIN,9)ISTDA,ISTMØ,ISTYR,ISTHM,IENDA,IENMØ,IENYR,IENHM,ISKP
     9  FØRMAT(      3I2,I4,5X,3I2,I4,5X,I5)
        IF(ISTDA-99)409,305,305
   409  WRITE(IIØUT,6365)ISTDA,ISTMØ,ISTYR,ISTHM,IENDA,IENMØ,IENYR,
      1 IENHM,ISKP
  6365  FØRMAT('GRAFG2: START DATE ',3I2,I4,', END DATE ',3I2,I4,', ISKP=
      1',I4)
        IF(ISKP.EQ.0) GØ TØ  8
        CALL SKPREC(ITAPE,ISKP)
        GØ TØ(999,8,999,999,999,999) IND
     8  CONTINUE
    10  WRITE(IIØUT,7)PLNUM
     7  FØRMAT('START PLØT NUMBER = ',F4.0)
CS      CALL WHERE(XØRG,YØRG)
        CALL WHERE(XØRG,YØRG, RFACT)
        CALL PLØT(XØRG,YØRG,-3)
C    ANNØTATING PLØT NUMBER
        CALL NUMBER(0.0,0.0,0.14,PLNUM,0.0,-1)
C
C           ANØTATE PLØT WITH LABEL AND DATE
C
        CALL SYMBØL(-2.0,0.0,0.14,LABEL,90.,80)
  5050  CALL SYMBØL(-1.0,0.0,0.07,NØW,90.,16)
  5055  CALL PLØT(0.0,0.0,-3)
C
C    MØVING PEN TØ ØRIGIN ØF PLØT
        YT=-(BØT/YFAC)
        IF(YT)205,210,210
   205  YT=0.0
   210  XT=-(DLEFT/XFAC)
        IF(XT)215,220,220
   215  XT=0.0
   220  XT=XT+1.0
        YT=YT+1.0
        CALL PLØT(XT,YT,3)
        CALL GRIDG(ZZ,HGT,XFAC,YFAC,TØP,BØT,DLEFT,RIGT)
        PLNUM = PLNUM + 1.0
  15    CONTINUE
C  START NEW PLØT
    22  IF (ISW(10))24,26,24
    24  CALL PLØT(8.0,0.0,-3)
        GØ TØ 10
    26  CONTINUE
   300  IF(ISW(3).EQ.0) GØ TØ 302
        CALL GETL (ITAPE, NX, NY, NZ, NW, DATAX,DATAY,DATAZ,DATAW,RLAT,
      1 RLØNG, JDA, JMØ, JYR, JHM, IEØD)
        GØ TØ 304
   302  CALL GETG (ITAPE, NX, NY, NZ, NW, DATAX,DATAY,DATAZ,DATAW,RLAT,
      1 RLØNG, JDA, JMØ, JYR, JHM, IEØD)
   304  IF(IEØD)350,350,305
C       EØF ØR EØT ENCØUNTERED DURING READ --- QUIT
  305   CALL PLØT (XX, YY, 999)
        WRITE (IIØUT,1020) INREC,IGREC,IAREC,IPREC
  1020  FØRMAT('NUMBER RECØRDS INPUT = ',I,/,
      1 'NUMBER RECØRDS ØUT ØF GRAPH BØUNDS = ',I,/,
      2 'NUMBER RECØRDS ØUT ØF AREA BØUNDS = ',I,/,
      3 'NUMBER RECØRDS PLØTTED = ',I)
        CALL EXIT
C  CHECKING FØR BEGINNING DATE
  35C   CØNTINUE
        INREC = INREC + 1
        KGDA = JDA
        KGMØ=JMØ
        KGYR=JYR
        KGHM=JHM
186     CØNTINUE
C      IFLAG IS A FLAG TØ ALLØW SKIPPING THE FIRST CALL TØ FIND
C       IF WE HAVE ALREADY  FØUND THE STARTING DATE
C
        IF(IFLAG.NE.0) GØ TØ 182
        CALL FIND(ISTDA,ISTMØ,ISTYR,ISTHM,KGDA,KGMØ,KGYR,KGHM,INDK)
        IF(INDK.EQ.-1) GØ TØ 3CC
        IFLAG=1
  182   CØNTINUE
        IF(IENYR.EQ.0) GØ TØ 851
        CALL FIND(IENDA,IENMØ,IENYR,IENHM,KGDA,KGMØ,KGYR,KGHM,INDK)
        IF(INDK.EQ.1) GØ TØ  995
 851    CØNTINUE
  852   CØNTINUE
C  CHECKING IF DATA WITHIN CHART BØUNDRIES
   85   IF(ISW(0))102,104,102
  102   WRITE(IIØUT,103)RLAT,RLØNG,RTØP,RBØT,RLEFT,RRIGT
  103   FØRMAT(6E12.5)
  104   IF(RTØP-RLAT) 100,100,86
   86   IF(RLAT-RBØT) 100,88,88
   88   IF(RLØNG-RLEFT) 100,90,90
   9C   IF(RRIGT-RLØNG) 100,10C,92
C  DATA WITHIN BØUNDS
   92   GØ TØ 35
C       DATA ØUT ØF AREA BØUNDS
  10C   IAREC = IAREC + 1  ;  GØ TØ 89O
   35 CØNTINUE
C
C       CHECKING IF LUNAR DATA IS WITHIN ALTITUDE BØUNDS
C
        IF (ISW(4).EQ.0) GØ TØ 45
        IF ((DATAZ-BSVEC).LE.0) GØ TØ 890
        IF ((TSVEC-DATAZ).LE.0) GØ TØ 890
   45   XX = DATAX/XFAC
        YY = DATAY/YFAC
C       CHECKING IF DATA IS IN GRAPH BØUNDS
        IND=0
        IF(TØPY-YY)50,50,52
   5C   YY=TØPY
        IND=1
   52   IF(YY-BØTY)54,54,60
   54   YY=BØTY
        IND=1
   6C   IF(XX-DLEFX)62,62,66
   62   XX=DLEFX
        IND=1
   66   IF(RIGTX-XX)68,68,69
   68   XX=RIGTX
        IND=1
C       IF IND = 1 DATA PØINT IS ØUT ØF GRAPH BØUNDS
   69   IF(IND.EQ.1) IGREC = IGREC + 1  ;  GØ TØ 890
   80  CALL PLOT(XX,YY,3)
       CALL SPOT(XX,YY)
       IPREC = IPREC + 1
       IF(ISW(13))82,890,82
   82  XT=XX+XINC
       YT=YY+YINC
       CALL NUMBER (XT, YT, HGT, DATAW, ANGB, IDEC)
       CALL PLOT(XX,YY,3)
  890  CONTINUE
  900  IF(IENYR.EQ.0) GO TO 951
       CALL FIND(IENDA,IENMO,IENYR,IENHM,KGDA,KGMO,KGYR,KGHM,INDK)
       IF(INDK.EQ.0)  GO TO 940
       GO TO 150
  940  XT=RIGTX+5.0
       YT=BOTY
       CALL PLOT(XT,YT,3)
       IF(ISW(7))402,402,6
  951    GO TO 150
 995   WRITE(IIOUT,996) KGDA,KGMO,KGYR,KGHM
 996   FORMAT('END DATE PASSED',2X,3I2,I4)
       CALL PLOT(XX,YY,999)
       CALL EXIT
 999   WRITE(IIOUT,998) IND
 998   FORMAT('ERROR IN SKPREC,IND=',I3)
       CALL PLOT(XX,YY,999)
       CALL EXIT
  150  GO TO 15
       END
```

```
NAME   TYPE CLASS    HEX    DEC      NAME   TYPE CLASS    HEX    DEC      NAME   TYPE CLASS    HEX    DEC
                     LØC   WØRDS                          LØC   WØRDS                          LØC   WØRDS
----   ---- -----  ------- -----     ----   ---- -----  ------- -----     ----   ---- -----  ------- -----
AMIN      R SCALR  00426 V     1     ANGB      R SCALR  00416 V     1     BØT       R SCALR  0041D V     1
BØTY      R SCALR  00421 V     1     BSVEC     R SCALR  0042C V     1     DATAW     R SCALR  00440 V     1
DATAX     R SCALR  0043D V     1     DATAY     R SCALR  0043E V     1     DATAZ     R SCALR  0043F V     1
DLEFT     R SCALR  0041E V     1     DLEFX     R SCALR  00422 V     1     DMTØR     R SPRØG  EXTERN
EXIT        SPRØG  EXTERN            FIND        SPRØG  EXTERN            GETG        SPRØG  EXTERN
GETL        SPRØG  EXTERN            GRIDG       SPRØG  EXTERN            HGT       R SCALR  0041B V     1
IAREC     I SCALR  00402 V     1     IBUF      I ARRAY  00000 V  1000     IDEC      I SCALR  0040F V     1
IDEG      I SCALR  00425 V     1     IENDA     I SCALR  00433 V     1     IENHM     I SCALR  00436 V     1
IENMØ     I SCALR  00434 V     1     IENYR     I SCALR  00435 V     1     IEØD      I SCALR  00447 V     1
IFLAG     I SCALR  0042E V     1     IGREC     I SCALR  004C1 V     1     IIN       I SCALR  00404 V     1
IIØUT     I SCALR  004C5 V     1     IND       I SCALR  004C9 V     1     INDK      I SCALR  0044E V     1
INIT      I SCALR  00407 V     1     INPT      I SCALR  004C6 V     1     INREC     I SCALR  00400 V     1
IPREC     I SCALR  00403 V     1     ISKP      I SCALR  00437 V     1     ISTDA     I SCALR  0042F V     1
ISTMM     I SCALR  00432 V     1     ISTMØ     I SCALR  00430 V     1     ISTYR     I SCALR  00431 V     1
ISW       I SPRØG  EXTERN            ITAPE     I SCALR  0040A V     1     JDA       I SCALR  00443 V     1
JHM       I SCALR  00446 V     1     JMØ       I SCALR  00444 V     1     JYR       I SCALR  00445 V     1
KGDA      I SCALR  0044A V     1     KGHM      I SCALR  0044D V     1     KGMØ      I SCALR  0044B V     1
KGYR      I SCALR  0044C V     1     KHT       I SCALR  00411 V     1     KPT       I SCALR  00410 V     1
LABEL     I ARRAY  003EC V    20     LN        I SCALR  00424 V     1     NØW       I ARRAY  003E8 V     4
NUMBER      SPRØG  EXTERN            NW        I SCALR  004CE V     1     NX        I SCALR  0040B V     1
NY        I SCALR  0040C V     1     NZ        I SCALR  004CD V     1     PLNUM     R SCALR  00408 V     1
PLØT        SPRØG  EXTERN            PLØTS       SPRØG  EXTERN            RADN      R SCALR  00427 V     1
RBØT      R SCALR  00429 V     1     RFACT     R SCALR  0043A V     1     RIGT      R SCALR  0041F V     1
RIGTX     R SCALR  00423 V     1     RLAT      R SCALR  00441 V     1     RLEFT     R SCALR  0042A V     1
RLØNG     R SCALR  00442 V     1     RRIGT     R SCALR  0042B V     1     RTØP      R SCALR  00428 V     1
SETSKP      SPRØG  EXTERN            SKPREC      SPRØG  EXTERN            SPØT        SPRØG  EXTERN
STAT        SPRØG  EXTERN            SYMBØL      SPRØG  EXTERN            TØDAY       SPRØG  EXTERN
TØP       R SCALR  0041C V     1     TØPY      R SCALR  00420 V     1     TSVEC     R SCALR  0042D V     1
WFAC      R SCALR  00415 V     1     WHERE       SPRØG  EXTERN            XFAC      R SCALR  00412 V     1
XINC      R SCALR  00417 V     1     XØRG      R SCALR  00438 V     1     XT        R SCALR  0043C V     1
XX        R SCALR  00448 V     1     YFAC      R SCALR  00413 V     1     YINC      R SCALR  00418 V     1
YØRG      R SCALR  00439 V     1     YT        R SCALR  0043B V     1     YY        R SCALR  00449 V     1
ZFAC      R SCALR  00414 V     1     ZHT       R SCALR  0041A V     1     ZZ        R SCALR  00419 V     1

          HEX                HEX                HEX                HEX                HEX                HEX
LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC
-----    -----     -----    -----     -----    -----     -----    -----     -----    -----     -----    -----
    2    00057         3    00087         4    000D3         5    00101         6    000FB         7    00181
    8    0017C         9    00143        10    0017C        11    00043        15    001D9        22    001D9
   24    001DE        26    001E4        35    00291        45    0029C        50    002A7        52    002A8
   54    002AE        60    00282        62    002B5        66    00289        68    002BC        69    002C0
   80    002C5        82    002D4        85    00270        86    00285        88    00288        90    0028B
   92    0028E       100    0028F       102    00275       103    0027F       104    00282       110    00113
  120    00118       130    0011D       140    00122       150    00334       182    00260       186    0024E
  205    001B7       210    001B9       215    0018F       220    001C1       300    001E4       302    001FC
  304    0020E       305    0021C       350    00245       402    00124       403    0012F       407    00134
  409    0014D       851    00270       852    00270       890    002E7       900    002E7       940    002F7
  951    00307       995    003C8       996    00310       998    00325       999    00320      1020    0021D
 5021    0001D      5022    00023      5023    0002C      5050    001A4      5055    001AC      6365    0015A

LØCAL VARIABLES (11C3 WØRDS):

   00000 IBUF       003E8 NØW        003EC LABEL      004C0 INREC      00401 IGREC      00402 IAREC
   00403 IPREC      004C4 IIN        004C5 IIØUT      004C6 INPT       00407 INIT       00408 PLNUM
 00409 INC        C04CA ITAPE      004CB NX         004CC NY         0040D NZ         0040E NW
 0040F IDEC       00410 KPT        00411 KHT        00412 XFAC       00413 YFAC       00414 ZFAC
 00415 WFAC       00416 ANGB       00417 XINC       00418 YINC       00419 ZZ         0041A ZHT
 0041B HGT        0041C TØP        0041D BØT        0041E DLEFT      0041F RIGT       00420 TØPY
 00421 BØTY       00422 DLEFX      00423 RIGTX      00424 LN         00425 IDEG       00426 AMIN
 00427 RADN       00428 RTØP       00429 RBØT       0042A RLEFT      0042B RRIGT      0042C BSVEC
 0042D TSVEC      0042E IFLAG      0042F ISTDA      00430 ISTMØ      00431 ISTYR      00432 ISTHM
 00433 IENDA      00434 IENMØ      00435 IENYR      00436 IENHM      00437 ISKP       00438 XØRG
 00439 YØRG       0043A RFACT      0043B YT         0043C XT         0043D DATAX      0043E DATAY
 0043F DATAZ      00440 DATAW      00441 RLAT       00442 RLØNG      00443 JDA        00444 JMØ
 00445 JYR        00446 JHM        00447 IEØD       00448 XX         00449 YY         0044A KGDA
 0044B KGMØ       0044C KGYR       0044D KGHM       0044E INDK

BLANK CØMMØN (0 WØRDS)

EXTERNAL SUBPRØGRAMS REQUIRED:

   DMTØR      EXIT       FIND       GETG       GETL       GRIDG      ISW        NUMBER
   PLØT       PLØTS      SETSKP     SKPREC     SPØT       STAT       SYMBØL     TØDAY
   WHERE      F:101      F:102      F:103      F:104      F:105      F:106      F:108
   M:DØ       M:ØC       9BCDREAD   9BCDWRIT   9ENDIØL    9INITIAL   9IØDATA    9IØLUSA
   9ITØR      9PRINT

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC      HEX
                     WØRDS    WØRDS
                     -----    -----
  GENERATED CØDE:     821     00335
       CØNSTANTS:      21     00015
 LØCAL VARIABLES:    1103     0044F
           TEMPS:       0     00000
                     -----    -----
   TØTAL PRØGRAM:    1945     00799
```

```
C       PRØGRAM GRAV1
        ØUTPUT 'PRØGRAM GRAV1, VERSIØN 7 APRIL 1975'
C     MØDIFIED BY C BØWIN FRØM BØUG2 VERSIØN ØF 1 SEPT 1971
C
C
C  PRØGRAM GRAV1, REPRØDUCES PRINCIPAL FACTS AT FØRMAT ØF 3 JULY 1969
C           AND CØMPLETES THE 132 CHARACTER GSUM FØRMAT.  ØBSERVED
C           GRAVITY IS CALCULATED IF ISW(3) = 1
C
C       ØUTPUT IS AT IGSN71 DATUM AND ANØMALIES CALCULATED WITH
C               INTERNATIØNAL GRAVITY FØRMULA ØF 1967.
C
C
C  ASSUMED CRUSTAL DENSITY IS ENTERED AT RUN TIME
C       RECALCULATES BØUGUER ANØMALY AT DENSITY ENTERED AT RUN TIME
C
C
        DIMENSIØN IA(30)
C
C  SSW(1)  =1 FØR INPUT ELEV IN FEET
C          =0   FØR INPUT ELEV IN METERS
C  SSW(2)  =1 FØR INPUT DEPTH IN FATHØMS
C          =0   FØR INPUT DEPTH IN METERS
C  SSW(3)  =1  TØ CALCULATE ØBSERVED GRAVITY FRØM FA ANØMALY
C  SSW(4)  =0  INPUT DATA IS ALREADY AT IGSN71 AND INT. GRAV FØRM 1967
C          =1  INPUT DATA AT PØTSDAM SYSTEM AND INT GRAV FØRM 1930
C  SSW(6)  =1 FØR INCØRPØRATING TERRAIN CØRRECTIØN
C          =0   FØR NØT USING TERRAIN CØRRECTIØN
C  SSW( )  =1 TØ PRINT VALUES ØF THEØ AND FELEV
C  SSW(13) =1 TØ ASSIGN A STATIØN NUMBER, NUMERICALLY  STARTING WITH
C                    FIRST INPUT RECØRD AS 1.
C  SSW(16) =1 TØ ØUTPUT ØN LINE PRINTER ØNLY (GINØT)
C  SSW(31) =1 TØ PUNCH GSUM ØUTPUT ØN 2 CARDS EACH (GINØT)
C
C  IF DEPTH = 0, THEN PRØGRAM ASSUMES DATA IS FØR A
C    LAND STATIØN AND USES ELEV IN BØUGUER CØMPUTATIØN
C  ØUTPUT ELEV AND DEPTH VALUES ARE IN METERS
C
C       USES STAT, GINØT, GINTF,GI67F, ISW, NAVIN, RTØM2
C
C
C   ************************************************************
C  ITAPE = URN FØR INPUT
C  ØTAPE = URN FØR ØUTPUT
        ITAPE = 1
        ØTAPE = 2
C  ************************************************************
C
        IIN = 105
        INPUT = 105
        CALL STAT
        INIT = ISW(-2)
        NCT=0
        ISN = 0
        IRECD=0
        IDIF = 0
        FA=0.0
        BG=0.0
        F = .
```

```
            IREGC=0
            IFFC=0
            IFBC=0
            DØ 1 J=1,35
            IA(J) = 1H
      1     CØNTINUE
C     CRDEN = ASSUMED CRUSTAL DENSITY
            READ (IIN, 2) CRDEN
 2          FØRMAT (F10.0)
            ØUTPUT CRDEN
C           SET SSW(30) =1 SØ GINØT WILL NØT TRY TØ READ EITP CARDS
            II = ICHG(30,1)
           KK=0
           CALL        GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
          1   KGYR,KGHM,IDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
          2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
 50         CØNTINUE
    52      READ(ITAPE,14)ISØRC,KGDA,KGMØ,KGYR,KGHM,LAT,
          1   RLATM,KNS,LØNG,RLØM,KEW,ELEV,K977,ØBSG,
          2   IDEP,TC,IELC,IGC,AFA,ABG,ABGCM
    14      FØRMAT(I4,3I2,I4,I2,F5.2,A1,I3,F5.2,A1,F7.2,
          1   I3,F6.2,I5,F4.1,2I2,3F6.1)
            CALL STAT(I)
            CALL EVIL(IIØUT,I,IBAD,KGDA,KGMØ,KGYR,KGHM)
            IF (IBAD) 50, 53, 55
   55       END FILE JTAPE
            WRITE(IIØUT,54)NCT
    54      FØRMAT('END ØF PRØCESSING,  NCT = ',I8)
            CALL EXIT
    53      CØNTINUE
            IF(ISW(13).EQ.1) ISN = ISN+1;KGHM = ISN;
          1     KGDA = 0; KGMØ = 0; KGYR = 0
    70      DEPTH=IDEP
            CALL NAVIN(LAT,RLATM,KNS,LØNG,RLØM,KEW,RLAT,RLØNG)
            THEØ=GINTF(RLAT)
           TH67 = GI67F(RLAT)
            DIF = (K977 -977)*1000
C
            IF(ISW(0))40,42,40
C     CØNVERTING FEET TØ METERS
    40      ELEV = ELEV * 0.304801
    42      FELEV = ((0.30855 + 0.00022*CØS(2.*RLAT))*ELEV)
          1 -(((FLEV*0.001)**2.0)*0.072)
            FA=AFA
            IF(ISW(3).EQ.0) ZGØBS = ØBSG + DIF ; GØ TØ 505
            IF(ISW(4).EQ.0) ZGØBS = (AFA - FELEV) + TH67 ; GØ TØ 520
C
C           CALCULATE ØBSERVED GRAV IN 1930 IGF
C
            PGØBS = (AFA - FELEV) + THEØ
            GØ TØ 510
   505      IF (ISW(4).EQ.0) GØ TØ 550
            PGØBS = ZGØBS
C
C           CHANGE TØ IGSN 71
   510      ZGØBS = PGØBS - 14.0
   520      TGØBS = ZGØBS * 0.001
            IGØBS = TGØBS
            K977 = 977 + IGØBS
      ØBSG = ZGØBS - A
C
C     CALCULATE FREE AIR ANØMALY
C
  550 FA = (ZGØBS - TH67) + FELEV
      IF(ISW(3))43,45,43
   43 WRITE(IIØUT,44)THEØ,FELEV,TH67
   44 FØRMAT(3F10.2)
   45 IF(ISW(2))46,200,46
C  CØNVERTING FATHØMS TØ METERS
   46 DEPTH = DEPTH * 1.8288
      IDEP=DEPTH
C  CHECKING IF WATER STATIØN
  200 CØNTINUE
      IF(IDEP)165,160,165
C  NØ, ASSUME IT IS A LAND STATIØN
  160 DENS = CRDEN
       THICK =-ELEV
      GØ TØ 170
C  YES, IT IS A WATER STATIØN
  165 DENS = CRDEN - 1.03
      THICK = DEPTH
  170 BG = FA + (0.04185*DENS*THICK)
C  INCØRPØRATE TERRAIN CØRRECTIØN
      IF(ISW(6))76,74,76
   74 TC=99.9
      BGCØM=999.0
      GØ TØ 80
   76 IF(TC-99.7)79,78,78
   78 BGCØM=999.0
      GØ TØ 80
   79 BGCØM = BG + TC
C   RØUNDING BGCØM
      IF(BGCØM)279,280,280
  279 BGCØM=BGCØM-0.05
      GØ TØ 80
  280 BGCØM=BGCØM+0.05
C  RØUNDING ØF FREE-AIR
   80 IF(FA)201,220,220
  201 FA=FA-0.05
      GØ TØ 250
  220 FA=FA+0.05
C  RØUNDING ØF BØUGUER
  250 IF(BG)255,260,260
  255 BG=BG-0.05
      GØ TØ 380
  260 BG=BG+0.05
  380 CØNTINUE
     KK=-2
     CALL        GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
    1   +GYR,KGHM,IDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
    2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
      NCT=NCT+1
      GØ TØ 50
      END
```

```
                               HEX      DEC                                HEX      DEC                                HEX      DEC
NAME   TYPE CLASS              LØC      WØRDS   NAME   TYPE CLASS          LØC      WØRDS   NAME   TYPE CLASS          LØC      WØRDS
----   ---- -----            --------   -----   ----   ---- -----        --------   -----   ----   ---- -----        --------   -----
A         R SCALR            00058 V       1    ABG       R SCALR        0004B V       1    ABGCM     R SCALR        0004C V       1
AFA       R SCALR            0004A V       1    BG        R SCALR        0002D V       1    BGCØM     R SCALR        0005B V       1
CØS       R SPRØG            INTRIN             CRØEN     R SCALR        00033 V       1    DENS      R SCALR        00059 V       1
DEPTH     R SCALR            0004F V       1    DIF       R SCALR        00052 V       1    ELEV      R SCALR        0003D V       1
EVIL        SPRØG            EXTERN             EXIT        SPRØG        EXTERN             FA        R SCALR        0002C V       1
FELEV     R SCALR            00053 V       1    GINIT       SPRØG        EXTERN             GINTF     R SPRØG        EXTERN
GI67F     R SPRØG            EXTERN             I         I SCALR        0004D V       1    IA        I ARRAY        00000 V      35
IBAD      I SCALR            0004E V       1    ICHG      I SPRØG        EXTERN             IDEP      I SCALR        00040 V       1
IDIF      I SCALR            0002B V       1    IELC      I SCALR        00042 V       1    IFØC      I SCALR        00031 V       1
IFFC      I SCALR            00030 V       1    IGC       I SCALR        00043 V       1    IGØBS     I SCALR        00057 V       1
II        I SCALR            00034 V       1    IIN       I SCALR        00025 V       1    IIØUT     I SCALR        00026 V       1
INIT      I SCALR            00027 V       1    IREC2     I SCALR        0002A V       1    IREGC     I SCALR        0002F V       1
ISN       I SCALR            00029 V       1    ISØBC     I SCALR        0003A V       1    ISW       I SPRØG        EXTERN
ITAPE     I SCALR            00023 V       1    J         I SCALR        00032 V       1    JTAPE     I SCALR        00024 V       1
KEW       I SCALR            00049 V       1    KGDA      I SCALR        00036 V       1    KGHM      I SCALR        00039 V       1
KGMØ      I SCALR            00037 V       1    KGYR      I SCALR        00038 V       1    KK        I SCALR        00035 V       1
KNS       I SCALR            00046 V       1    K977      I SCALR        0003E V       1    LAT       I SCALR        00044 V       1
LØNG      I SCALR            00047 V       1    NAVIN       SPRØG        EXTERN             NCT       I SCALR        00028 V       1
ØBSG      R SCALR            0003F V       1    PGØBS     R SCALR        00055 V       1    RFA       R SCALR        0002E V       1
RLAT      R SCALR            0003B V       1    RLATM     R SCALR        00045 V       1    RLØM      R SCALR        00048 V       1
RLØNG     R SCALR            0003C V       1    STAT        SPRØG        EXTERN             TC        R SCALR        00041 V       1
TGØBS     R SCALR            00056 V       1    THEØ      R SCALR        00050 V       1    THICK     R SCALR        0005A V       1
TH67      R SCALR            00051 V       1    ZØØPS     R SCALR        00054 V       1


        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC
-----  -----       -----  -----       -----  -----       -----  -----       -----  -----       -----  -----
    1  00036           2  0003D          14  00085          40  000E5          42  000E8          43  00133
   44  0013A          45  0013D          46  00142          50  0006C          52  0006C          53  00088
   54  000AC          55  000A5          70  000C6          74  0015F          76  00164          78  00167
   79  0016A          80  00176         160  0014A         165  00150         170  00155         200  00148
  201  00178         220  0017C         250  0017F         255  00181         260  00185         279  0016F
  280  00173         300  00188         505  00110         510  00117         520  0011A         550  0012A


LØCAL VARIABLES (92 WØRDS):

  00000 IA          00023 ITAPE       00024 JTAPE       00025 IIN         00026 IIØUT       00027 INIT
  00028 NCT         00029 ISN         0002A IREC2       0002B IDIF        0002C FA          0002D BG
  0002E RFA         0002F IREGC       00030 IFFC        00031 IFØC        00032 J           00033 CRØEN
  00034 II          00035 KK          00036 KGDA        00037 KGMØ        00038 KGYR        00039 KGHM
  0003A ISØBC       0003B RLAT        0003C RLØNG       0003D FLEV        0003E K977        0003F ØBSG
  00040 IDEP        00041 TC          00042 IELC        00043 IGC         00044 LAT         00045 RLATM
  00046 KNS         00047 LØNG        00048 RLØM        00049 KEW         0004A AFA         0004B ABG
  0004C ABGCM       0004D I           0004E IBAD        0004F DEPTH       00050 THEØ        00051 TH67
  00052 DIF         00053 FELEV       00054 ZØØPS       00055 PGØBS       00056 TGØBS       00057 IGØBS
  00058 A           00059 DENS        0005A THICK       0005B BGCØM

BLANK CØMMØN (0 WØRDS)

INTRINSIC SUBPRØGRAMS USED:

  CØS
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EXTERNAL SUBPROGRAMS REQUIRED:

   EVIL         FXIT         GINOT        GINTF        GI67F        ICHG         ISW          NAVIN
   STAT         F:101        F:102        F:103        F:104        F:105        F:106        F:108
   M:DO         M:C          9BCDREAD     9BCDWRIT     9COS         9ENDFILE     9ENDIOL      9INITIAL
   9IODATA      9ITOR        9PRINT       9PWRRR       9RTOI

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                       DEC       HEX
                      WORDS     WORDS
                      -----     -----
  GENERATED CODE:      423      001A7
       CONSTANTS:       26      0001A
 LOCAL VARIABLES:       92      0005C
           TEMPS:        1      00001
                      -----     -----
   TOTAL PROGRAM:      542      0021E
```

```
C        PRØGRAM GSTØG
C   PRØGRAM GSTØG,  CØNVERTS SEAG1 FØRMAT TØ GSUM FØRMAT
C
C        VERSIØN 25 JUNE 75,  TØ ADD ØUTPUT STATEMENT
C        VERSIØN 13 JAN 75 TØ READ IREC=2
C   VERSIØN ØF 4 ØCT 1971,  TØ USE GINØT FØR ØUTPUT
C    VERSIØN ØF 20 JANUARY 1971
C
C        SIGMA 7 VERSIØN HANDLES SINGLE REEL INPUT ØNLY
C
C   SSW(12) UP TØ LIST DATA IDENTIFICATIØN
C
C        USES BICØR, STAT, ISW, EVIL
C
C        CALLS STAT, MCVØL, GETDCB FRØM ACCØUNT 3 LIBRARY
C
C
         DIMENSIØN MAG(2)
         DIMENSIØN MAG1(5),MAG2(5),IBLK(21)
         DIMENSIØN IA(35),IZ(9),IW(35)
         DIMENSIØN NØW(4)
         IIN = 105
         IIØUT = 108
C
C       PRINT DATE AND TIME ØF JØB ØN HEADING
        CALL TØDAY(NØW)
        WRITE(IIØUT,13) NØW
   13   FØRMAT(1X,4A4)
C
        ØUTPUT 'GSTØG VERSIØN ØF 25 JUNE 75'
C
  215   IREC1=1
C    FØR MULTIFILE MAGTAPE INPUT
         NEF=1
C     FØR WRITING EØF ØN JTAPE
         IFLAG=1
         CALL STAT
         INN = ISW(=2)
         NZERØ=0
         KGDAØ = NZERØ
         KGMØØ=NZERØ
         KGYRØ=NZERØ
         KGHMØ=NZERØ
C
C        ******************************************************
C        ITAPE = INPUT TAPE
C         JTAPE = ØUTPUT TAPE
         ITAPE = 1
         JTAPE = 2
C        ******************************************************
C
         IDIF=0
         ELEV=0.0
         TC=99.9
         RFA=0.0
         IREGC=0
         IFFC=7
         IFBC=0
```

```
      NREJ = 0
     ICHECK = 0
      NØUT=0
      DEGRA=1.745329E-2
C
C     ISØRC = SØURCE NUMBER
C     IDCØD = 0 FØR ID BY DATE, 1 FØR ID BY STA NØ.
C     IELC = ELEVATIØN CØDE
C     IGC = G-METER CØDE
C     BIAS = MGAL BIAS
C     NFILE = NUMBER ØF FILES TØ BE INPUT
C
      READ (IIN,2) ISØRC, IDCØD, IELC, IGC, BIAS
    2 FØRMAT (4I5, F10.0)
      ØUTPUT ISØRC, IDCØD, IELC, IGC, BIAS
      READ (IIN, 5) NFILE
    5 FØRMAT ( I5)
      WRITE(IIØUT, 7786) NFILE
 7786 FØRMAT('GSTØG: NFILE=',I5)
      IF(IDCØD)230,226,230
  226 KGDA=0
      KGMØ=0
      KGYR=0
C
C
  230 CØNTINUE
      KK=0
      CALL        GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
     1  KGYR,KGHM,IDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
     2  IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
C
C
C
C  READ INPUT DATA
   50 CØNTINUE
   52 READ(ITAPE,360)IREC1,KGDA,KGMØ,KGYR,KGHM,IDIF,
     1  RLAT,RLØNG,KVN,KVE,K977,IØGR,KFA,KBG,KCVN,
     2  KCVE,KCDM,MTDC,MT,MAG(1),MAG(2),KETVØ
  360 FØRMAT(I1,3I2, I4,I3,2F9.6,2I5,I3,I4,5I8,I3,
     1 I2,I1,I4,I5)
      CALL STAT(I)
      CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)
C        IBAD = -, PARITY ØR FØRMAT ERRØR
C        IBAD = 0, READ WAS ØK
C        IBAD = +, END ØF FILE ØR END ØF TAPE ENCØUNTERED
      IF (IBAD) 50, 53, 575
   53 IF(IREC1.EQ.2) GØ TØ 70
      IF(IREC1 .NE. 1) GØ TØ 60
      IF(ICHECK.EQ.1) GØ TØ 70
      ØUTPUT'***** INPUT IS IN 1930 IGF *****'
     ICHECK = 1
      GØ TØ 70
   60 IF(IREC1-9)50,62,50
   62 READ(ITAPE,64)IREC9,IZ,IZ1,ITEST
   64 FØRMAT(I1,2I3,I4)
      IF(ITEST-6563)580,565,580
  565 WRITE(IIØUT,570)
  570 FØRMAT('EØR')
CS    PAUSE 400
CS    GØ TØ 50
```

```
C       EVIL HAS FOUND AN END OF FILE MARK ON INPUT
 575    IF (NEF - NFILE) 576, 577, 577
 576    NEF = NEF + 1
        CALL MCVOL (ITAPE)
        GO TO 50
C       END OF INPUT DATA, REQUIRED NO. OF FILES NOW PROCESSED
  577   IF(IFLAG.NE.1)GO TO 578
       END FILE JTAPE
  578   WRITE(IIOUT,579)NREJ,NOUT
  579   FORMAT ('END OF PROCESSING',/,
     1  'NUMBER OF RECORDS REJECTED BECAUSE OF INVALID GRAVITY =',I6
     2  /,'NUMBER OF RECORDS OUTPUT =',I6)
        CALL EXIT
  580   IF(ITEST-6665)68,65,68
   65   WRITE(IIOUT,601)
  601   FORMAT('EOD')
        GO TO 575
   68   WRITE(IIOUT,69)
   69   FORMAT('IREC1=9')
        GO TO 50
   70   CONTINUE
        KGDAO=KGDA
        KGMOO=KGMO
        KGYRO=KGYR
        KGHMO=KGHM
C
C  CHECKING GRAVITY FOR INVALID DATA
C
        IF(K977.LE.0) NREJ = NREJ +1; GO TO 50
        IF(KFA.GE.9900) NREJ= NREJ +1; GO TO 50
        OBSG=FLOAT(IOGR)*0.1
        FA= FLOAT(KFA)*0.1
        BG=FLOAT(KBG)*0.1
        IDEP=KCDM
        CALL BICOR(K977,OBSG,BIAS)
        IF(FA-990.0)85,87,87
   85   FA=FA+BIAS
   87   IF(BG-990.0)88,90,90
   88   BG=BG+BIAS
   90   CONTINUE
C  GROUPING VARIABLES FOR OUTPUT UNDER ARRAY IA
        ENCODE(35,410,IZ)KVN,KVE,KCVN,KCVE,KETVO,MTDC,MT
  410   FORMAT(4I5,I5,I3,I2,5X)
        CALL UNPKBY(IZ,IW,35)
        DO 420 J=1,35
        IA(J)=ISL(IW(J),24)
  420   CONTINUE
C
        KK=-2
        CALL       GINOT(ITAPE,JTAPE,KK,KGDA,KGMO,
     1    KGYR,KGHM,IDIF,ISORC,RLAT,RLONG,ELEV,K977,OBSG,
     2    IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
        NOUT=NOUT+1
        GO TO 50
C       WRITE END OF FILE RECORD
 999    END FILE JTAPE
        WRITE(IIOUT,330)KGDA,KGMO,KGYR,KGHM
  330   FORMAT('DATA BEFORE EOR= ',3I3,I5)
        CALL EXIT
       END
```

```
                               HEX      DEC                                      HEX      DEC                                      HEX      DEC
NAME     TYPE  CLASS           LØC      WØRDS      NAME     TYPE  CLASS          LØC      WØRDS      NAME     TYPE  CLASS          LØC      WØRDS
----     ----  -----         -------    -----      ----     ----  -----        -------    -----      ----     ----  -----        -------    -----
BG          R  SCALR         0009E V        1      BIAS        R  SCALR        00091 V        1      BICØR          SPRØG        EXTERN
DEGRA       R  SCALR         0008C V        1      ELEV        R  SCALR        00082 V        1      EVIL           SPRØG        EXTERN
EXIT           SPRØG         EXTERN                FA          R  SCALR        0009D V        1      FLØAT       R  SPRØG        INTRIN
GINØT          SPRØG         EXTERN                I           I  SCALR        000AA V        1      IA          I  ARRAY        00021 V       35
IBAD        I  SCALR         000AB V        1      IBLK        I  ARRAY        000CC V       21      ICHECK      I  SCALR        0008A V        1
IDCØD       I  SCALR         0008E V        1      IDEP        I  SCALR        0009C V        1      IDIF        I  SCALR        00081 V        1
IELC        I  SCALR         0008F V        1      IFBC        I  SCALR        00087 V        1      IFFC        I  SCALR        00086 V        1
IFLAG       I  SCALR         00078 V        1      IGC         I  SCALR        00090 V        1      IIN         I  SCALR        00074 V        1
IIØUT       I  SCALR         00075 V        1      INN         I  SCALR        00079 V        1      IØGR        I  SCALR        000A1 V        1
IREC1       I  SCALR         00076 V        1      IREC9       I  SCALR        000AC V        1      IREGC       I  SCALR        00085 V        1
ISL         I  SPRØG         INTRIN                ISØRC       I  SCALR        0008D V        1      ISW         I  SPRØG        EXTERN
ITAPE       I  SCALR         0007F V        1      ITEST       I  SCALR        000AE V        1      IW          I  ARRAY        0004D V       35
IZ          I  ARRAY         00044 V        9      IZ1         I  SCALR        000AD V        1      J           I  SCALR        000AF V        1
JTAPE       I  SCALR         0008C V        1      KBG         I  SCALR        000A3 V        1      KCDM        I  SCALR        000A6 V        1
KCVE        I  SCALR         000A5 V        1      KCVN        I  SCALR        000A4 V        1      KETVØ       I  SCALR        000A9 V        1
KFA         I  SCALR         000A2 V        1      KGDA        I  SCALR        00093 V        1      KGDAØ       I  SCALR        0007B V        1
KGHM        I  SCALR         00097 V        1      KGHMØ       I  SCALR        0007E V        1      KGMØ        I  SCALR        00094 V        1
KGMØØ       I  SCALR         0007C V        1      KGYR        I  SCALR        00095 V        1      KGYRØ       I  SCALR        0007D V        1
KK          I  SCALR         00096 V        1      KVE         I  SCALR        000A0 V        1      KVN         I  SCALR        0009F V        1
K977        I  SCALR         0009A V        1      MAG         I  ARRAY        000C0 V        2      MAG1        I  ARRAY        00002 V        5
MAG2        I  ARRAY         00007 V        5      MCVØL          SPRØG        EXTERN               MT          I  SCALR        000A8 V        1
MTDC        I  SCALR         000A7 V        1      NEF         I  SCALR        00077 V        1      NFILE       I  SCALR        00092 V        1
NØUT        I  SCALR         0008B V        1      NØW         I  ARRAY        00070 V        4      NRECT       I  SCALR        00088 V        1
NREW        I  SCALR         00089 V        1      NZERØ       I  SCALR        0007A V        1      ØBSG        R  SCALR        0009B V        1
RFA         R  SCALR         00084 V        1      RLAT        R  SCALR        00098 V        1      RLØNG       R  SCALR        00099 V        1
STAT           SPRØG         EXTERN                TC          R  SCALR        00083 V        1      TØDAY          SPRØG        EXTERN
UNPKBY         SPRØG         EXTERN


        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
    2   00059        5   0007C       13   0000E       50   000AE       52   000AE       53   000E5
   60   000FF       62   001C2       64   0010D       65   00152       68   0015A       69   0015E
   70   00163       85   0018A       87   0018D       88   00190       90   00193      215   0001E
  226   0008B      230   00091      330   001DB      360   000C8      410   0019F      420   00180
  565   00114      570   00118      575   0011B      576   0011E      577   00123      578   00128
  579   0012E      580   0014F      601   00156      999   001D1     7786   00083

LØCAL VARIABLES (176 WØRDS):

   000C0 MAG        000C2 MAG1       000C7 MAG2       000CC IBLK       00021 IA         00044 IZ
   0004C IW         00070 NØW        00074 IIN        00075 IIØUT      00076 IREC1      00077 NEF
   00078 IFLAG      00079 INN        0007A NZERØ      0007B KGDAØ      0007C KGMØØ      0007D KGYRØ
   0007E KGHMØ      0007F ITAPE      00080 JTAPE      00081 IDIF       00082 ELEV       00083 TC
   00084 RFA        00085 IREGC      00086 IFFC       00087 IFBC       00088 NRECT      00089 NREJ
   0008A ICHECK     0008B NØUT       0008C DEGRA      0008D ISØRC      0008E IDCØD      0008F IELC
   00090 IGC        00091 BIAS       00092 NFILE      00093 KGDA       00094 KGMØ       00095 KGYR
   00096 KK         00097 KGHM       00098 RLAT       00099 RLØNG      0009A K977       0009B ØBSG
   0009C IDEP       0009D FA         0009E BG         0009F KVN        000A0 KVE        000A1 IØGR
   000A2 KFA        000A3 KBG        000A4 KCVN       000A5 KCVE       000A6 KCDM       000A7 MTDC
   000A8 MT         000A9 KETVØ      000AA I          000AB IBAD       000AC IREC9      000AD IZ1
   000AE ITEST      000AF J
```

```
BLANK COMMON (0 WORDS)

INTRINSIC SUBPROGRAMS USED:

   FLOAT      ISL

EXTERNAL SUBPROGRAMS REQUIRED:

   BICOR      EVIL       EXIT       GINOT      ISW        MCVOL      STAT       TODAY
   UNPKBY     F:101      F:102      F:103      F:104      F:105      F:106      F:108
   M:DO       M:OC       9BCDREAD   9BCDWRIT   9ENCODE    9ENDFILE   9ENDIOL    9INI
   9IODATA    9IOLLSA    9ITOR      9PRINT     9STOP

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                     DEC       HEX
                    WORDS     WORDS
                    -----     -----
  GENERATED CODE:    487      001E7
       CONSTANTS:      6      00006
 LOCAL VARIABLES:    176      000B0
           TEMPS:      0      00000
                    -----     -----
   TOTAL PROGRAM:    669      0029D
```

```
C      PROGRAM GSTOG67
C      PROGRAM GSTOG67 MOD OF GSTOG TO DO 1967 FORULA AND 71 DATUM
C       CHANGE WHERE NECESSARY
C      MOD FROM GSTOG OF 25 JUNE 75
C  PROGRAM GSTOG,  CONVERTS SEAG1 FORMAT TO GSUM FORMAT
C
C      VERSION OF 10 MAR 76 TO FIX IRECC FOR I/P AT 67
C      VERSION OF 5 AUG 75 TO DO 67 FORMAULA CONVERSION
C      AND TO WRITE GSUM O/P BLOCKED BY 50
       OUTPUT 'GSTOG67 VERSION 10 MAR 76'
C        VERSION 25 JUNE 75,  TO ADD OUTPUT STATEMENT
C        VERSION 13 JAN 75 TO READ IREC=2
C  VERSION OF 4 OCT 1971,  TO USE GINOT FOR OUTPUT
C   VERSION OF 20 JANUARY 1971
C
C        SIGMA 7 VERSION HANDLES SINGLE REEL INPUT ONLY
C
C  SSW(12) UP TO LIST DATA IDENTIFICATION
C
C
C
C
       DIMENSION IBUFOT(32,50)
        DIMENSION MAG(2)
        DIMENSION MAG1(5),MAG2(5),IBLK(21)
        DIMENSION IA(35),IZ(9),IW(35)
        DIMENSION NOW(4)
        IIN = 105
        IIOUT = 108
       KI=1
       KO=-2
C
C      PRINT DATE AND TIME OF JOB ON HEADING
        CALL TODAY(NOW)
        WRITE(IIOUT,13) NOW
   13  FORMAT(1X,4A4)
C
       RADEG=57.2958
C
  215  IREC1=1
C   FOR MULTIFILE MAGTAPE INPUT
        NEF=1
C    FOR WRITING EOF ON JTAPE
        IFLAG=1
       NROUT=0
        INN = ISW(-2)
       IAKEY=0
       NIN=0
        NZERO=0
        KGDAO = NZERO
        KGMOO=NZERO
        KGYRO=NZERO
        KGHMO=NZERO
C
C       *****************************************************
C       ITAPE = INPUT TAPE
C        JTAPE = OUTPUT TAPE
        ITAPE = 1
        JTAPE = 2
```

```
      C       *****************************************************
      C
              IDIF=0
              ELEV=0.0
             IREC=2
              TC=99.9
              RFA=0.0
              IREGC=0
              IFFC=7
              IFBC=0
              NRECT=0
              KK=0
              NREJ = 0
             ICHECK = 0
              NØUT=0
              DEGRA=1.745329E-2
      C
      C       ISØRC = SØURCE NUMBER
      C       IDCØD = 0 FØR ID BY DATE, 1 FØR ID BY STA NØ.
      C       IELC = ELEVATIØN CØDE
      C       IGC = G-METER CØDE
      C       BIAS = MGAL BIAS
      C       NFILE = NUMBER ØF FILES TØ BE INPUT
      C
              READ (IIN,2) ISØRC, IDCØD, IELC, IGC, BIAS
       2      FØRMAT (4I5, F10.0)
              ØUTPUT ISØRC, IDCØD, IELC, IGC, BIAS
              READ (IIN, 5) NFILE
       5      FØRMAT ( I5)
              WRITE(IIØUT, 7786) NFILE
      7786    FØRMAT('GSTØG NFILE=',I5)
              IF(IDCØD)230,226,230
        226   KGDA=0
              KGMØ=0
              KGYR=0
      C
      C
        230   CONTINUE
      C
      C
      C
      C  READ INPUT DATA
         50   CØNTINUE
         52   READ(ITAPE,360,END=575,ERR=50)IREC1,KGDA,KGMØ,KGYR,KGHM,IDIF,
            1   RLAT,RLØNG,KVN,KVE,K977,IØGR,KFA,KBG,KCVN,
            2   KCVE,KCDM,MTDC,MT,MAG(1),MAG(2),KETVØ
       360    FØRMAT(I1,3I2, I4,I3,2F9.6,2I5,I3,I4,5I5,I3,
            *  I2,I1,I4,I5)
             IF(IREC1.EQ.2) GØ TØ 70
             IF(IREC1.NE.1) ØUTPUT 'IREC NE 1 ØR 2';ØUTPUT NREJ,NRØUT,NØUT;STØP
      C                    CØNVERSIØN TØ 67
             IGØBS=(K977*10000)+IØGR
             IGØBS=IGØBS-140
             K977=IGØBS/10000
             IØGR=IGØBS-K977*10000
             DG=3.2-(13.6*(SIN(ABS(RLAT))**2))
             KDG=IFIX(DG*10.0)
             IF(KFA.LT.9990) KFA=KFA+KDG
             IF(KBG.LT.9990) KBG=KBG+KDG
             GØ TØ 70
```

```
C                        END OF FILE
  575   IF (NEF - NFILE) 576, 577, 577
  576   NEF = NEF + 1
        CALL MCVOL (ITAPE)
        GO TO 50
C       END OF INPUT DATA, REQUIRED NO. OF FILES NOW PROCESSED
   577  IF(IFLAG.NE.1)GO TO 578
C                        LAST BUFF OUT
       IF(NROUT.EQ.0) GO TO 1577
       CALL BUFFER OUT(JTAPE,0,IBUFOT(1,1),NROUT*32)
  1577 CONTINUE
       END FILE JTAPE
   578  WRITE(IIOUT,579)NREJ,NOUT
   579  FORMAT ('END OF PROCESSING',/,
      1 'NUMBER OF RECORDS REJECTED BECAUSE OF INVALID GRAVITY =',I6,
      2 /,'NUMBER OF RECORDS OUTPUT =',I6)
        CALL EXIT
   580  IF(ITEST-6665)68,65,68
    65  WRITE(IIOUT,601)
   601  FORMAT('EOD')
        GO TO 575
    68  WRITE(IIOUT,69)
    69  FORMAT('IREC1=9')
        GO TO 50
    70  CONTINUE
        KGDAO=KGDA
        KGMOO=KGMO
        KGYRO=KGYR
        KGHMO=KGHM
C
C  CHECKING GRAVITY FOR INVALID DATA
C
        IF(K977.LE.0) NREJ = NREJ +1; GO TO 50
        IF(KFA.GE.9900) NREJ= NREJ +1; GO TO 50
       DLAT=RLAT*RADEG
       PLAT=DLAT+90.;LTKEY=PLAT
       DLONG=RLONG*RADEG
       PLONG=DLONG+180.; LGKEY=PLONG
        OBSG=FLOAT(IOGR)*0.1
        FA= FLOAT(KFA)*0.1
        BG=FLOAT(KBG)*0.1
        IDEP=KCDM
        CALL BICOR(K977,OBSG,BIAS)
        IF(FA-990.0)85,87,87
   85   FA=FA+BIAS
   87   IF(BG-990.0)88,90,90
   88   BG=BG+BIAS
   90   CONTINUE
C  GROUPING VARIABLES FOR OUTPUT UNDER ARRAY IA
        ENCODE(35,410,IZ)KVN,KVE,KCVN,KCVE,KETVO,MTOC,MT
   410  FORMAT(4I5,I5,I3,I2,5X)
        CALL UNPKBY(IZ,IW,35)
        DO 420 J=1,35
        IA(J)=ISL(IW(J),24)
   420  CONTINUE
C
       IF(NROUT.EQ.50) CALL BUFFER OUT(JTAPE,0,IBUFOT(1,1),1600,JKEY);
      *      NROUT=0
       NROUT=NROUT+1
       ENCODE(128,1020,IBUFOT(1,NROUT),NE)
```

```
           *    IREC,ISORC,KGDA,KGMO,KGYR,KGHM,DLAT,DLONG,ELEV,
           *    K977,OBSG,IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,
           *    IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
      1020 FORMAT(I1,I4,3I2,I4,2F9.4,F7.2,I3,F6.2,I5,2F6.1,F4.1,
           *    2I2,F6.1,I1,I2,35A1,1X,I1,2I3,I2)
            NOUT=NOUT+1
            GO TO 50
     C      WRITE END OF FILE RECORD
      999   END FILE JTAPE
            WRITE(IIOUT,330)KGDA,KGMO,KGYR,KGHM
       330  FORMAT('DATA BEFORE EOM= ',3I3,I5)
            CALL EXIT
           END
```

```
                         HEX     DEC                                     HEX     DEC                                     HEX     DEC
NAME    TYPE CLASS       LOC     WORDS      NAME      TYPE CLASS         LOC     WORDS      NAME     TYPE CLASS          LOC     WORDS
----    ---- -----     --------  -----      ----      ---- -----       --------  -----      ----     ---- -----        --------  -----
ABS        R SPROG     INTRIN               BG           R SCALR       006F9 V       1      BIAS        R SCALR        006D9 V       1
BICOR        SPROG     EXTERN               BUFFEROU       SPROG       EXTERN               DEGRA       R SCALR        006D4 V       1
DG         R SCALR     006EE V      1       DLAT         R SCALR       006F1 V       1      DLONG       R SCALR        006F4 V       1
ELEV       R SCALR     006C8 V      1       EXIT           SPROG       EXTERN               FA          R SCALR        006F8 V       1
FLOAT      R SPROG     INTRIN               IA           I ARRAY       00661 V      35      IAKEY       I SCALR        006BE V       1
IBLK       I ARRAY     0064C V     21       IBUFOT       I ARRAY       00000 V    1600      ICHECK      I SCALR        006D2 V       1
IDCOD      I SCALR     006D6 V      1       IDEP         I SCALR       006FA V       1      IDIF        I SCALR        006C7 V       1
IELC       I SCALR     006D7 V      1       IFBC         I SCALR       006CE V       1      IFFC        I SCALR        006CD V       1
IFIX       I SPROG     INTRIN               IFLAG        I SCALR       006BB V       1      IGC         I SCALR        006D8 V       1
IGOBS      I SCALR     006ED V      1       IIN          I SCALR       006B4 V       1      IIOUT       I SCALR        006B5 V       1
INN        I SCALR     006BD V      1       IOGR         I SCALR       006E4 V       1      IREC        I SCALR        006C9 V       1
IREC1      I SCALR     006B9 V      1       INEGC        I SCALR       006CC V       1      ISL         I SPROG        INTRIN
ISORC      I SCALR     006D5 V      1       IOW          I SPROG       EXTERN               ITAPE       I SCALR        006C5 V       1
ITEST      I SCALR     006F0 V      1       IW           I ARRAY       0068D V      35      IZ          I ARRAY        00684 V       9
J          I SCALR     006FB V      1       JKEY         I SCALR       006FC V       1      JTAPE       I SCALR        006C6 V       1
KBG        I SCALR     006E6 V      1       KCDM         I SCALR       006E9 V       1      KCVE        I SCALR        006E8 V       1
KCVN       I SCALR     006E7 V      1       KDG          I SCALR       006EF V       1      KETVO       I SCALR        006EC V       1
KFA        I SCALR     006E5 V      1       KGDA         I SCALR       006DB V       1      KGDAO       I SCALR        006C1 V       1
KGHM       I SCALR     006DE V      1       KGHMO        I SCALR       006C4 V       1      KGMO        I SCALR        006DC V       1
KGMOO      I SCALR     006C2 V      1       KGYR         I SCALR       006DD V       1      KGYRO       I SCALR        006C3 V       1
KI         I SCALR     006B6 V      1       KK           I SCALR       006D0 V       1      KO          I SCALR        006B7 V       1
KVE        I SCALR     006E2 V      1       KVN          I SCALR       006E1 V       1      K977        I SCALR        006E3 V       1
LGKEY      I SCALR     006F6 V      1       LTKEY        I SCALR       006F3 V       1      MAG         I ARRAY        00640 V       2
MAG1       I ARRAY     00642 V      5       MAG2         I ARRAY       00647 V       5      MCVOL         SPROG        EXTERN
MT         I SCALR     006E8 V      1       MTDC         I SCALR       006EA V       1      NE          I SCALR        006FD V       1
NEF        I SCALR     006BA V      1       NFILE        I SCALR       006DA V       1      NIN         I SCALR        006BF V       1
NOUT       I SCALR     006D3 V      1       NOW          I ARRAY       006B0 V       4      NRECT       I SCALR        006CF V       1
NREJ       I SCALR     006D1 V      1       NROUT        I SCALR       006BC V       1      NZERO       I SCALR        006C0 V       1
OBSG       R SCALR     006F7 V      1       PLAT         R SCALR       006F2 V       1      PLONG       R SCALR        006F5 V       1
RADEG      R SCALR     006B8 V      1       RFA          R SCALR       006CB V       1      RLAT        R SCALR        006DF V       1
RLONG      R SCALR     006E0 V      1       SIN          R SPROG       INTRIN               TC          R SCALR        006CA V       1
TODAY        SPROG     EXTERN               UNPKBY         SPROG       EXTERN


         HEX               HEX               HEX               HEX               HEX               HEX
LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
    2   00066         5   00089        13   0001E        50   0009E        52   0009E        65   00150
   68   00158        69   0015C        70   00161        85   0019A        57   0019D        88   001A0
   90   001A3       215   00023       226   00098       230   0009E       330   00214       360   0008A
  410   001AF       420   001C0       575   0010E       576   00111       577   00116       578   00126
  579   0012C       580   00140       601   00154       999   0020A      1020   001F3      1577   00124
 7786   00090


LOCAL VARIABLES (1790 WORDS)!

   00000 IBUFOT      00640 MAG         00642 MAG1        00647 MAG2        0064C IBLK        00661 IA
   00684 IZ          0068D IW          006B0 NOW         006B4 IIN         006B5 IIOUT       006B6 KI
   006B7 KO          006B8 RADEG       006B9 IREC1       006BA NEF         006BB IFLAG       006BC NROUT
   006BD INN         006BE IAKEY       006BF NIN         006C0 NZERO       006C1 KGDAO       006C2 KGMOO
   006C3 KGYRO       006C4 KGHMO       006C5 ITAPE       006C6 JTAPE       006C7 IDIF        006C8 ELEV
   006C9 IREC        006CA TC          006CB KFA         006CC INEGC       006CD IFFC        006CE IFBC
   006CF NRECT       006D0 KK          006D1 NREJ        006D2 ICHECK      006D3 NOUT        006D4 DEGRA
   006D5 ISORC       006D6 IDCOD       006D7 IELC        006D8 IGC         006D9 BIAS        006DA NFILE
   006DB KGDA        006DC KGMO        006DD KGYR        006DE KGHM        006DF RLAT        006E0 RLONG
  006E1 KVN         006E2 KVE         006E3 K977        006E4 IOGR        006E5 KFA         006E6 KBG
  006E7 KCVN        006E8 KCVE        006E9 KCDM        006EA MTDC        006EB MT          006EC KETVO
  006ED IGOBS       006EE DG          006EF KDG         006F0 ITEST       006F1 DLAT        006F2 PLAT
  006F3 LTKEY       006F4 DLONG       006F5 PLONG       006F6 LGKEY       006F7 OBSG        006F8 FA
  006F9 BG          006FA IDEP        006FB J           006FC JKEY        006FD NE

BLANK COMMON (0 WORDS)

INTRINSIC SUBPROGRAMS USED:

  ABS        FLOAT      IFIX       ISL        SIN

EXTERNAL SUBPROGRAMS REQUIRED:

  BICOR      BUFFEROU   EXIT       ISW        MCVOL      TODAY      UNPKBY     FI101
  FI102      FI103      FI104      FI105      FI106      FI108      MIDB       MIDC
  9BCDRDEE   9BCDREAD   9BCDWRIT   9ENCODE    9ENDFILE   9ENDIOL    9INITIAL   9IODATA
  9IOLUSA    9ITOR      9PRINT     9RTOI      9SIN       9STOP

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                    DEC      HEX
                   WORDS    WORDS
                   -----    -----
 GENERATED CODE:    544     00220
      CONSTANTS:     15     0000F
LOCAL VARIABLES:   1790     006FE
          TEMPS:      1     00001
                   -----    -----
  TOTAL PROGRAM:   2350     0092E
```

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C      PRØGRAM G3DCP
C      VERSIØN ØF 1 MAY 75 TØ ZERØ EVERYTHING IN SIGHT
C      VERSIØN ØF 17 APR 75 FØR XERØX CP-V CØMPATIBILITY
C      VERSIØN5 FEB 75 TØ INCREASE PRINT SPACE FØR RHØ*Z
C      VERSIØN 5 FEB 75 TØ EASE INTERFACE WITH I/P PREP
C      BJS VERSIØN ØF 22/7/74 TØ CØMPUTE PØTENTIAL FRØM BØDY
C      ØUTPUTS HEIGHT ØF SEA (+ DØWN) AND MGAL DIFFERENCE
C      VERSIØN ØF 20 MAY 74 TØ INCREASE RESØLUTIØN ØF Z
C VERSIØN ØF 23 APRIL 73 TØ INCREASE RESØLUTIØN ØF PRINTED VALUE ØF
C                         WEIGHT AND WEIGHTEST
C     VERSIØN 29 MARCH 73 TØ CHANGE SSW 19 & 20 TØ 38& 39
C      VERSIØN 20 MARCH 1973 TØ CALL PLANET FØR RADIUS  (LAG)
C      3D PRØG     FIELD PØINTS ARE GIVEN BY K=1,KK. CØNTØURS ARE GIVEN  G3DC0010
C      BY M=1,MQ. THE VERTICES FØR EACH CØNTØUR ARE GIVEN BY I=1,II.II   G3DC0020
C      DIFFERENT FØR EACH CØNTØUR AND IS GIVEN BY II=E(M), MID(M) IS I   G3DC0030
C      FØR EACH CØNTØUR.                                                 G3DC0040
C      SENSE SWITCH ØPTIØNS
C          SSW (38)=0  FØR SPHERICAL EARTH .
C                  =1  FØR SPHERICAL MØØN
C                  =2  FØR SPHERICAL MARS
C          SSW(39) TØ BE RESERVED FØR LATER USE IN SUBR PLANET
        CØMMØN UIII( 20,10),URHØ( 20,10),UZEE( 20,10),UMID( 20,10)       G3DC0050
        CØMMØN XX(50),YY(50),IA(35),BELP(102),BEL(102),E(102),SIGMA(102) G3DC0060
        CØMMØN UU(30),UZU(30),UT(30), GG(102) ,UZT(30),IMM(30)           G3DC0070
        CØMMØN III(102),RHØ(102),ZEE(102),ZZEE(102),MID(1                G3DC0080
     1102),V(102),DEL(102),DELP(102),X(20,20,10),Y(20,20,10)             G3DC0090
       CØMMØN  F(102),PDEL(102),PDELP(102)
        DØUBLE PRECISIØN RVDR,DRA,DZZ,TT,TX
        INTEGER BD                                                       G3DC0100
       DØ20 I=1,102
       BELP(I)=0.0
       BEL(I)=0.0
       DEL(I)=0.0
       DELP(I)=0.0
       E(I)=0.0
       F(I)=0.0
       GG(I)=0.0
       III(I)=0
       MID(I)=0
       PDEL(I)=0.0
       PDELP(I)=0.0
       RHØ(I)=0.0
       SIGMA(I)=0.0
       V(I)=0.0
       ZEE(I)=0.0
       ZZEE(I)=0.0
    20 CØNTINUE
       DØ 21 I=1,30
       IMM(I)=0
       UT(I)=0.0
       UU(I)=0.0
       UZT(I)=0.0
       UZU(I)=0.0
    21 CØNTINUE
       DØ 22 I=1,35
       IA(I)=0
    22 CØNTINUE
       DØ 23 I=1,20
       DØ 24 J=1,10
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```
      UIII(I,J)=0.0
      UMID(I,J)=0.0
      URHO(I,J)=0.0
      UZEE(I,J)=0.0
   24 CØNTINUE
   23 CØNTINUE
      DØ 25 I=1,20
      DØ 26 J=1,20
      DØ 27 K=1,10
      X(I,J,K)=0.0
      Y(I,J,K)=0.0
   27 CØNTINUE
   26 CØNTINUE
   25 CØNTINUE
      DØ 28 I=1,50
      XX(I)=0.0
      YY(I)=0.0
   28 CØNTINUE
      A=0.0
      AA=0.0
      ALPH1=0.0
      ALPH2=0.0
      ANØM=0.0
      ANØM1=0.0
      B=0.0
      BB=0.0
      BDC=0.0
      BETA1=0.0
      BETA2=0.0
      BG=0.0
      C=0.0
      CC=0.0
      D=0.0
      DELT1=0.0
      DELT2=0.0
      DØG=0.0
      DØGG=0.0
      DØGGS=0.0
      DØGS=0.0
      DRA=0.0
      DZZ=0.0
      EGA=0.0
      ELEV=0.0
      EGA=0.0
      EMM=0.0
      FAG=0.0
      FELZ=0.0
      FX=0.0
      FY=0.0
      FZ=0.0
      GAMM1=0.0
      GAMM2=0.0
      GM=0.0
      I=0
      IBEGG=0
      IDEP=0
      IDIF=0
      IELC=0
      IFBC=0
      IGC=0
      II=0
      IN=0
      INCARD=0
      INIT=0
      IØUT=0
      IRMA=0
      ISØRC=0
      ITAPE=0
      ITST=0
      JTAPE=0
      JTST=0
      K=0
      KDA=0
      KGHM=0
      KGMØ=0
      KGYR=0
      KJ=0
      KK=0
      K977=0
      L=0
      LDP=0
      M=0
      MM=0
      MN=0
      MØ=0
      MP=0
      MRS=0
      MUM=0
      NGG=0
      NGØ=0
      ØBSG=0.0
      P=0.0
      PANØM=0.0
      PARFEZ=0.0
      PB=0.0
      PC=0.0
      PDENS=0.0
      PFELZ=0.0
      PIE=0.0
      PMASS=0.0
      PSFELZ=0.0
      PSI=0.0
      RA=0.0
      RFA=0.0
      RHCZ=0.0
      RHØZ=0.0
      RKM=0.0
      RLAT=0.0
      RLØNG=0.0
      RVAR=0.0
      RVDR=0.0
      R1=0.0
      R2=0.0
      R3=0.0
      S=0.0
      SFELZ=0.0
      SHCZ=0.0
      SHØZ=0.0
      SIGA=0.0
      SØM=0.0
      SØM1=0.0
      SØM2=0.0
      SS=0.0
      STV=0.0
      T=0.0
      TAU=0.0
      TC=0.0
      TS=0.0
      TT=0.0
      TU=0.0
      TV=0.0
      TX=0.0
      U=0.0
      W=0.0
      Z=0.0
      ZT=0.0
      ZU=0.0
      ZZ=0.0
      T=0.0
      U=0.0
       FAG=0.0                                                          G3DC0110
       ITAPE =1;  JTAPE=2;   CALL STAT                                  G3DC0120
      ØUTPUT 'G3DCF VERSIØN ØF 1 MAY 75'
       BD=0                                                             G3DC0130
       K=0                                                              G3DC0140
      IØUT =108                                                         G3DC0150
      INCARD=105
      IN=3
        ITST=0; JTST=0; INIT=ISW(-2);  PIE=.062832                      G3DC0170
       CALL CØØRR(FX,FY,RLØNG,RLAT,ITST,JTST) ;   JTST=1                G3DC0180
       KJ=0                                                             G3DC0190
       CALL GINØT(ITAPE,JTAPE,KW,KDA,KGMØ,KGYR,KGHM,IDIF,ISØRC,RLAT,    G3DC0200
     1 RLØNG,ELEV,K977,ØBSG,IDEF,FAG,BG,TC,IELC,IGC,RFA,IBEGG,IFFC,IA,  G3DC0210
     2 IFEC)                                                            G3DC0220
      CALL PLANET(KK,RKM,PMASS,GM,PDENS)
 1000 KJ=1                                                              G3DC0230
      READ(INCARD,1020) RFW,RFD,RFG,J,AUX,VU,VT,GGG,PUN
 1020 FØRMAT(    F8.1,F4.2,F5.1,I1,F2.1,2F12.6,2F2.1)                   G3DC0250
       WRITE(IØUT,1021)   RFW,RFD,RFG,J,AUX,VU,VT,GGG,PUN               G3DC0260
 1021 FØRMAT(1H ,    F8.1,F6.3,F5.1,I5,F4.1,2F12.6,2F4.1)               G3DC0270
 1001 BD=BD+1                                                           G3DC0280
       WRITE(IØUT,1003) BD                                              G3DC0290
 1003  FØRMAT(///,'THIS IS BØDY ',I2,/)                                 G3DC0300
       READ(IN,1002) MQ,UU(BD),UZU(BD),UT(BD),UZT(BD),LBP               G3DC0310
 1002  FØRMAT(I2,2(F2.1,F12.6),I1)                                      G3DC0320
       WRITE(IØUT,943) MQ,UU(BD),UZU(BD),UT(BD),UZT(BD)                 G3DC0330
  943 FØRMAT(I4,2(F4.1,F12.6))                                          G3DC0340
      MM=MG+1                                                           G3DC0350
       IMM(BD)= MM                                                      G3DC0360
 1025  DØ 1064 M=2,MM                                                   G3DC0370
      READ(IN,1030) UMID(M,BD),URHØ(M,BD),UZEE(M,BD),DUM                G3DC0380
 1030  FØRMAT( I2,F10.4,F16.6,F6.2)
       URHØ(M,BD)=URHØ(M,BD)-RFD                                        G3DC0400
      WRITE(IØUT,1031)UMID(M,BD),URHØ(M,BD),UZEE(M,BD),DUM              G3DC0410
 1031  FØRMAT(1H I2,F10.4,F16.6,F6.2)
       II=0                                                             G3DC0430
      MUM= M-1                                                          G3DC0440
      IF(DUM)3,4,3                                                      G3DC0450
    3 IF(M-2)5,4,5                                                      G3DC0460
    5  DØ 6 I=1,UIII(MUM,BD)                                          G3DC0470
    6 X(M,I,BD)=X(MUM,I,BD)                                           G3DC0480
      GØTØ1050                                                        G3DC0490
 1041 FØRMAT(1H 6F12.5)
    4  II=II+1                                                        G3DC0510
      READ(IN,1040) X(M,II,BD),Y(M,II,BD),LPT                         G3DC0520
 1040  FØRMAT(2F12.5,I1)
       IF(LPT)4,4,12                                                  G3DC0540
   12  UIII(M,BD)=II                                                  G3DC0550
 1050  IF(DUM.EQ.1) GØ TØ 1064                                        G3DC0560
        GØ TØ (1051,1052,1053,1054), 1+ISW(1)+2*ISW(3)                G3DC0570
 1051 WRITE(IØUT,1041) (X(M,I,BD),Y(M,I,BD),I=1,II); GØ TØ 1064       G3DC0580
 1052   DØ 1055 I=1,II                                                G3DC0590
      CALL CØRR(XX(I),YY(I),X(M,I,BD),Y(M,I,BD),ITST,JTST)            G3DC0600
 1055 X(M,I,BD)=XX(I);  Y(M,I,BD)=YY(I)                               G3DC0610
        GØ TØ 1051                                                    G3DC0620
 1053   JTST=0                                                        G3DC0630
        DØ 1056 I=1,II                                                G3DC0640
      CALL CØRR(X(M,I,BD),Y(M,I,BD),XX(I),YY(I),ITST,JTST)            G3DC0650
 1056 WRITE(IØUT,1041) XX(I),YY(I)                                    G3DC0660
       GØ TØ 1064                                                     G3DC0670
 1054  DØ 1063 I=1,II                                                 G3DC0680
      CALL CØRR(X(M,I,BD),Y(M,I,BD),XX(I),YY(I),ITST,JTST)            G3DC0690
      WRITE(IØUT,1041) XX(I),YY(I)                                    G3DC0700
 1063 X(M,I,BD)=XX(I);  Y(M,I,BD)=YY(I)                               G3DC0710
 1064   CONTINUE                                                      G3DC0720
      IF(PUN)300,1061,300                                             G3DC0730
  300 IF(U)310,320,310                                                G3DC0740
  310 MØ=1                                                            G3DC0750
       UZEE(1,BD)=ZU                                                  G3DC0760
       E(1)=VL                                                        G3DC0770
      V(1)=VL                                                         G3DC0780
      F(1)=VL
      GØTØ 330                                                        G3DC0790
  320 MØ=2                                                            G3DC0800
  330 IF(T)340,350,340                                                G3DC0810
  340 MP=MM+1                                                         G3DC0820
       UZEE(MP,BD)=ZT                                                 G3DC0830
      V(MP)=VT                                                        G3DC0840
       E(MP)=VT                                                       G3DC0850
      F(MP)=VT
      GØTØ 360                                                        G3DC0860
  350 MP=MM                                                           G3DC0870
  360 NGØ=MP-MØ+1                                                     G3DC0880
      MRS=MØ+2                                                        G3DC0890
      NGG=NGØ-2                                                       G3DC0900
 1061  IF(LØP) 1001,1001,1060                                         G3DC0910
 1060   CØNTINUE                                                      G3DC0920
      BDC=BD                                                          G3DC0930
 1070  K=K+1                                                          G3DC0940
      BD=0                                                            G3DC0950
       JTST=1                                                         G3DC0960
      SØM=0.; SØM1=0.                                                 G3DC0970
      SHØZ=0.; SHCZ=0.                                                G3DC0980
      SØM2 = 0.
       WRITE(IØUT,1504)                                               G3DC0990
 1504 FØRMAT(1H ,'**********************************************************G3DC1000
     1************************************************************',///)  G3DC1010
      WRITE(IØUT,1075)                                                G3DC1020
 1075 FØRMAT(1H ////95H          FIELD PØINT CØØRDINATES              G3DC1030
      1                                          CØNTØUR DATA       //128H   K    XG3DC1040
      2             Y                  Z                        VERT.  DEPTH   DENSITY G3DC1050
      3 SIGMA A    RHØ*Z               V        DELTA PRIME     DELTA    /1H )         G3DC1060
 1078 FØRMAT(1H I2,F8.2,F12.2, F12.2)                                                  G3DC1070
       IF(ISW(1).EQ.0) GØ TØ 17                                                        G3DC1080
       IF(ISW(2))1520,1,1520                                                           G3DC1090
    1  CALL GINØT(ITAPE,JTAPE,KJ,KDA,KGMØ,KGYR,KGHM,IDIF,ISØRC,RLAT,                   G3DC1100
      1 RLØNG,ELEV,K977,ØBSG,IDEP,FAG,BG,TC,IELC,IGC,RFA,IBEGG,IFFC,IA,                G3DC1110
      2 IFEC)                                                                          G3DC1120
       IF(KJ.EQ.9) GØ TØ 1520                                                          G3DC1130
       CALL CØRR(FX,FY,RLØNG,RLAT,ITST,JTST)                                           G3DC1140
       FZ=ELEV/1000.                                                                   G3DC1150
       IF(ISW(3))18,1077,18                                                            G3DC1160
   17 READ(INCARD,1023) FX,FY,FZ,FAG,LDP
 1023  FØRMAT(3(F12.7),F6.2,I1)                                                        G3DC1180
       IF(ISW(3).EQ.1) GØ TØ 1072                                                      G3DC1190
 1077  WRITE(IØUT,1078) K,FX,FY,FZ                                                     G3DC1200
       GØ TØ 1062                                                                      G3DC1210
 1072  JTST=0                                                                          G3DC1220
       CALL CØRR(FX,FY,RLØNG,RLAT,ITST,JTST)                                           G3DC1230
   18  WRITE(IØUT,1078) K,RLAT,RLØNG,FZ                                                G3DC1240
 1062 BD=BD+1                                                                          G3DC1250
       WRITE(IØUT,1003) BD                                                             G3DC1260
      ZZEE(MØ-1)=UZEE(MØ,BD);  RHØZ=0;  RHCZ=0                                         G3DC1270
       MM=IMM(BD)                                                                      G3DC1280
 1079 DØ 1430 M=2,MM                                                                   G3DC1290
      SIGA = 0                                                                         G3DC1300
      SFELZ = 0                                                                        G3DC1310
      FSFELZ=0
      STV=0                                                                            G3DC1320
      U=UU(BD); ZU=UZU(BD); T=UT(BD); ZT=UZT(BD)                                       G3DC1330
      ZEE(M)=UZEE(M,BD); RHØ(M)=URHØ(M,BD)                                             G3DC1340
      III(M)=UIII(M,BD); MID(M)=UMID(M,BD)                                             G3DC1350
       Z=ZEE(M)-FZ                                                                     G3DC1360
 1090 ALPH1=X(M,1,BD)-FX                                                               G3DC1370
      BETA1=Y(M,1,BD)-FY                                                               G3DC1380
       R1 = SQRTF(ALPH1 ** 2  + BETA1 ** 2 )                                           G3DC1390
      IF (R1) 1100, 1105, 1100                                                         G3DC1400
 1100 GAMM1 = ALPH1 / R1                                                               G3DC1410
      DELT1= BETA1/R1                                                                  G3DC1420
 1105 IF(AUX)1110,1115,1110                                                            G3DC1430
1110  WRITE(IØUT,1112)  MID(M),III(M),ZEE(M),RHØ(M)                                    G3DC1440
 1112 FØRMAT (1H ///I2,12H   VERTICES=I2,9H   DEPTH=F7.2,11H   DENSITY=FG3DC1450
     15.2//101H  I     X(I)       Y(I)     X(I+1)     Y(I+1)          A                G3DC1460
      2  B                  C               D          PARFEZ      //1H )              G3DC1470
 1115 II = III(M)                                                                      G3DC1480
      DØ 1410 I = 2, II                                                                G3DC1490
      ALPH2=X(M,I,BD)-FX                                                               G3DC1500
      BETA2=Y(M,I,BD)-FY                                                               G3DC1510
      R2 = SQRTF (ALPH2 **2  + BETA2 ** 2 )                                            G3DC1520
      IF (R2) 1120, 1350, 1120                                                         G3DC1530
 1120 GAMM2 = ALPH2 /R2                                                                G3DC1540
      DELT2 = BETA2 / R2                                                               G3DC1550
 1130 IF (R1) 1140, 1350, 1140                                                         G3DC1560
 1140 SS=SQRTF((ALPH1-ALPH2)**2 +(BETA1-BETA2)**2 )                                    G3DC1570
      EGA=(ALPH1-ALPH2)/SS                                                             G3DC1580
      TAU=(BETA1-BETA2)/SS                                                             G3DC1590
      P = TAU * ALPH1 -    EGA * BETA1                                                 G3DC1600
      IF(ABSF(P)-.00001)1350,1350,1351                                                 G3DC1610
 1351 IF(P)1150,1350,1160                                                              G3DC1620
 1150 S = -1.                                                           G3DC1630
      GØ TØ 1170                                                        G3DC1640
 1160 S = 1.                                                            G3DC1650
 1170 EMM = BETA1 * ALPH2 - BETA2 * ALPH1                               G3DC1660
 1180 IF (EMM) 1190, 1350, 1200                                         G3DC1670
 1190 W = -1.                                                           G3DC1680
      GØ TØ 1210                                                        G3DC1690
 1200 W = 1.                                                            G3DC1700
 1210 IF(Z)12101,12102,12101                                            G3DC1710
12101 PSI=S*(Z/SQRTF(P**2+Z**2))                                        G3DC1720
12102 AA=GAMM1*GAMM2+DELT1*DELT2                                        G3DC1730
      IF (AA) 1225, 1220, 1230                                          G3DC1740
 1220 A = W* 1. 570796327                                               G3DC1750
      GØ TØ 1240                                                        G3DC1760
 1225 A = W * (ATANF((SQRTF(1. - AA ** 2 )) / AA) + 3.141592654)        G3DC1770
      GØ TØ 1240                                                        G3DC1780
 1230 A = W * ATANF((SQRTF(1. - AA ** 2 )) / AA)                        G3DC1790
 1240 IF(Z)12401,12402,12401                                            G3DC1800
12402 B=0                                                               G3DC1810
      C=0                                                               G3DC1820
      GØ TØ 1340                                                        G3DC1830
12401 BB=(PSI*(EGA*GAMM1+TAU*DELT1))                                    G3DC1840
      IF (BB - 1.) 1260, 1250, 1260                                     G3DC1850
 1250 B = 1.570796327                                                   G3DC1860
      GØ TØ 1290                                                        G3DC1870
 1260 IF ( BB + 1.) 1280,1270,1280                                      G3DC1880
 1270 B = -1.570796327                                                  G3DC1890
      GØ TØ 1290                                                        G3DC1900
 1280 B = ATANF(BB/(SQRTF(1. - BB ** 2 )))                              G3DC1910
 1290 CC =    (PSI * (  EGA * GAMM2 + TAU * DELT2 ))                    G3DC1920
      IF (CC - 1.) 1310,1300,1310                                       G3DC1930
 1300 C = 1.570796327                                                   G3DC1940
      GØ TØ 1340                                                        G3DC1950
 1310 IF(CC + 1.) 1330,1320,1330                                        G3DC1960
 1320 C=-1.570796327                                                    G3DC1970
      GØ TØ 1340                                                        G3DC1980
 1330 C=ATANF(CC/(SQRTF(1.-CC**2 )))                                    G3DC1990
 1340 D=C-B                                                             G3DC2000
      FELZ=A+D                                                          G3DC2010
      BB=EGA*GAMM1+TAU*DELT1;  CC=EGA*GAMM2+TAU*DELT2
      IF(1.LE.ABS(BB).ØR.1.LE.ABS(CC)) PB=1; PC=1; GØ TØ 1341
      PB = (SQRT(P**2+(1-BB**2)*Z**2)+S*P*BB)/SQRT(1-BB**2)
      PC = (SQRT(P**2+(1-CC**2)*Z**2)+S*P*CC)/SQRT(1-CC**2)
 1341 PFELZ =       Z*(D+A) -   P*LØG(PB/PC)
      GØ TØ 1360                                                        G3DC2020
 1350 FELZ=0                                                            G3DC2030
      PFELZ=0
      A=0                                                               G3DC2040
      B=0                                                               G3DC2050
      C=0                                                               G3DC2060
      D=0                                                               G3DC2070
 1360 IF(ALX)1370,1390,1370                                             G3DC2080
 1370 PARFEZ=  6.67*RHØ(M)*FELZ                                         G3DC2090
 1380   DØG=ALPH1+FX                                                    G3DC2100
        DØGS=BETA2+FY                                                   G3DC2110
        DØGG=ALPH2+FX                                                   G3DC2120
        DØGGS=BETA2+FY                                                  G3DC2130
      IRMA=I-1                                                          G3DC2140
      WRITE(IPUT,1385)          IRMA,DØG,DØGS,DØGG,DØGGS,A,B,C,D,PARFEZ G3DC2150
      WRITE(IPUT,9998)         SS,TAU,EGA,P                             G3DC2160
 9998 FØRMAT(4E18.7)                                                       G3DC2170
 1385 FØRMAT(1H I2,F9.2,F9.2,F9.2, F10.2, F12.7,F12.7, F12.7, F12.7,F12.G3DC2180
     16)                                                                   G3DC2190
 1390 SFELZ=SFELZ+FELZ                                                     G3DC2200
      PSFELZ=PSFELZ+PFELZ
      SIGA=SIGA+A                                                          G3DC2210
       L=0                                                                 G3DC2220
      RA=RKM-ZEE(M); ZZ=RKM-FZ
       DRA=DBLE(RA)
       DZZ=DBLE(ZZ)
       RVAR=R1                                                             G3DC2240
 1398  TS=1-Z/SQRTF(Z**2+RVAR**2)                                          G3DC2250
       RVDR=DBLE(RVAR)
       TT=DSQRT((DRA*DSIN(RVDR/DRA))**2+(DZZ-DRA*DCØS(RVDR/DRA))**2)
       TX=DRA*(2*DRA+TT-(DZZ**2-DRA**2)/TT)/(2*DZZ**2)
       TU=SNGL(TX)-TS
       L=L+1                                                               G3DC2290
       GØ TØ(1392,1393,1394,1395,1396),L                                   G3DC2300
 1392  TV=9*TU                                                             G3DC2310
       RVAR=R2                                                             G3DC2320
       GØ TØ 1398                                                          G3DC2330
 1393  TV=TV+9*TU                                                          G3DC2340
       RVAR=R1*R2*SIN(A)/((R1+R2)*SIN(A/2))                                G3DC2350
       R3=RVAR                                                             G3DC2360
       GØ TØ 1398                                                          G3DC2370
 1394  TV=TV+22*TU                                                         G3DC2380
       RVAR=R1*R3*SIN(A/2)/((R1+R3)*SIN(A/4))                              G3DC2390
       GØ TØ 1398                                                          G3DC2400
 1395  TV=TV+28*TU                                                         G3DC2410
       RVAR=R2*R3*SIN(A/2)/((R2+R3)*SIN(A/4))                              G3DC2420
       GØ TØ 1398                                                          G3DC2430
 1396  TV=(TV+28*TU)*(A/96)                                                G3DC2440
       STV=STV+TV                                                          G3DC2450
 1400 ALPH1=ALPH2                                                          G3DC2460
      BETA1=BETA2                                                          G3DC2470
      GAMM1=GAMM2                                                          G3DC2480
      DELT1=DELT2                                                          G3DC2490
      R1=R2                                                                G3DC2500
 1410 CØNTINUE                                                             G3DC2510
 1420 IF(SIGA)201,202,203                                                  G3DC2520
  201 IF(SIGA+.00001)204,205,205                                           G3DC2530
  205 SFELZ=SFELZ-SIGA                                                     G3DC2540
      GØTØ202                                                              G3DC2550
  203 IF(SIGA-.00001)205,205,206                                           G3DC2560
  204 IF(SIGA+6.2831754)207,207,2021                                       G3DC2570
 2021 IF(SIGA+3.1416027)202,2023,2022                                      G3DC2580
 2022 IF(SIGA+3.1415827)2023,2023,202                                      G3DC2590
 2023 SFELZ=SFELZ-SIGA-3.1415927                                           G3DC2600
      GØTØ 202                                                             G3DC2610
  207 SFELZ=SFELZ-SIGA-6.2831854                                           G3DC2620
      GØTØ202                                                              G3DC2630
  206 IF(SIGA-6.2831754)2024,208,208                                       G3DC2640
 2024 IF(SIGA-3.1415827)202,2025,2026                                      G3DC2650
 2026 IF(SIGA-3.1416027)2025,2025,202                                      G3DC2660
 2025 SFELZ=SFELZ-SIGA+3.1415927                                           G3DC2670
      GØTØ 202                                                             G3DC2680
  208 SFELZ=SFELZ-SIGA+6.2831854                                           G3DC2690
  202  V(M)=6.67*RHØ(M)*(SFELZ+STV)                                        G3DC2700
       E(M)=6.67*RHØ(M)*SFELZ                                              G3DC2710
      F(M)=6.67*RHØ(M)*PSFELZ
      SIGMA(M)=SIGA                                                     G3DC2720
 1430 CØNTINUE                                                          G3DC2730
      IF(U)1600,1610,1600                                               G3DC2740
 1600 MØ=1                                                              G3DC2750
      MID(1)=0                                                          G3DC2760
      III(1)=1                                                          G3DC2770
      ZEE(1)=ZU                                                         G3DC2780
      RHØ(1)=RHØ(2)                                                     G3DC2790
      SIGMA(1)=0.                                                       G3DC2800
      V(1)=VU                                                           G3DC2810
       E(1)=VU                                                          G3DC2820
      F(1)=VU
      GØ TØ 1620                                                        G3DC2830
 1610 MØ=2                                                              G3DC2840
 1620 IF(T)1630,1632,1630                                               G3DC2850
 1630 MP =MM+1                                                          G3DC2860
      MID(MP)=MID(MM)+1                                                 G3DC2870
      III(MP)=1                                                         G3DC2880
      ZEE(MP)=ZT                                                        G3DC2890
      RHØ(MP)=RHØ(MM)                                                   G3DC2900
      SIGMA(MP)=0.                                                      G3DC2910
       E(MP)=VT                                                         G3DC2920
      V(MP)=VT                                                          G3DC2930
      F(MP)=VT
      GØ TØ 1432                                                        G3DC2940
 1632 MP=MM                                                             G3DC2950
 1432 DEL(MØ)=0.                                                        G3DC2960
      DELP(MØ)=0.                                                       G3DC2970
      DELP(MØ+1)=0.                                                     G3DC2980
      DEL(MP)=0.                                                        G3DC2990
      ANØM=0                                                            G3DC3000
      BEL(MP)=0.                                                        G3DC3010
      BELP(MØ)=0.                                                       G3DC3020
      BELP(MØ+1)=0.                                                     G3DC3030
      BEL(MP)=0.                                                        G3DC3040
       ANØM1=0                                                          G3DC3050
      PDEL(MØ)=0.
      PDELP(MØ)=0.
      PDELP(MØ+1)=0.
      PDEL(MP)=0.
      PANØM=0
      MN=MP-2                                                           G3DC3060
 1440 DØ 1450 M=MØ,MN                                                   G3DC3070
      DEL(M+1) =       (V(M)*((ZEE(M) -ZEE(M+1))/ (ZEE(M) - ZEE(M+2))) *G3DC3080
     1(3.0 * ZEE(M+2) - 2. * ZEE(M) - ZEE(M+1)) + V(M+1) * ((ZEE(M) - ZFG3DC3090
     2E(M+1))/(ZEE(M+1) - ZEE(M+2))) * (3. * ZEE(M+2) - 2. * ZEE(M+1) - G3DC3100
     3ZFE(M)) + V(M+2) * ((ZEE(M) - ZEE(M+1)) ** 3  )/(( ZEE(M+1) - ZEE G3DC3110
     4(M+2)) * (ZEE(M) - ZEE(M+2))))/6.0                                G3DC3120
      BEL(M+1) =       (E(M)*((ZEE(M) -ZEE(M+1))/ (ZEE(M) - ZEE(M+2))) *G3DC3130
     1(3.0 * ZEE(M+2) - 2. * ZEE(M) - ZEE(M+1)) + E(M+1) * ((ZEE(M) - ZEG3DC3140
     2E(M+1))/(ZEE(M+1) - ZEE(M+2))) * (3. * ZEE(M+2) - 2. * ZEE(M+1) - G3DC3150
     3ZEE(M)) + E(M+2) * ((ZEE(M) - ZEE(M+1)) ** 3  )/(( ZEE(M+1) - ZEE G3DC3160
     4(M+2)) * (ZEE(M) - ZEE(M+2))))/6.0                                G3DC3170
      PDEL(M+1) =      (F(M)*((ZEE(M) -ZEE(M+1))/ (ZEE(M) - ZEE(M+2))) *
     1(3.0 * ZEE(M+2) - 2. * ZEE(M) - ZEE(M+1)) + F(M+1) * ((ZEE(M) - ZE
     2E(M+1))/(ZEE(M+1) - ZEE(M+2))) * (3. * ZEE(M+2) - 2. * ZEE(M+1) -
     3ZEE(M)) + F(M+2) * ((ZEE(M) - ZEE(M+1)) ** 3  )/(( ZEE(M+1) - ZEE
     4(M+2)) * (ZEE(M) - ZEE(M+2))))/6.0
      DELP(M+2) =      (V(M) * ((ZEE(M+1) - ZEE(M+2)) ** 3  ) / ((ZEE(MG3DC3180
     1) - ZEE(M+1)) * ( ZFE(M  ) - ZEE(M+2)))+ V(M+1) * ((ZEE(M+1) - 7EEG3DC3190
     2(M+2)) / (ZEE(M) - ZEE(M+1))) * ( ZEE(M+2) + 2. *ZEE(M+1) - 3.*ZEEG3DC3200
     3(M)) + V(M+2) * ((ZEE(M+1) - ZEE(M+2)) / (ZEE(M) - ZEE(M+2)))* (ZEG3DC3210
     4E(M+1) + 2. * ZEE(M+2) - 3. * ZEE(M)))/6.0                        G3DC3220
      BELP(M+2) =       (E(M) * ((ZEE(M+1) - ZEE(M+2)) ** 3  ) / ((ZEE(MG3DC3230
     1) - ZEE(M+1)) * ( ZEE(M  ) - ZEE(M+2)))+ E(M+1) * ((ZEE(M+1) - ZEEG3DC3240
     2(M+2)) / (ZEE(M) - ZEE(M+1))) * ( ZEE(M+2) + 2. *ZEE(M+1) - 3.*ZEEG3DC3250
     3(M)) + E(M+2) * ((ZEE(M+1) - ZEE(M+2)) / (ZEE(M) - ZEE(M+2)))* (ZEG3DC3260
     4E(M+1) + 2. * ZEE(M+2) - 3. * ZEE(M)))/6.0                        G3DC3270
      PDELP(M+2) =      (F(M) * ((ZEE(M+1) - ZEE(M+2)) ** 3  ) / ((ZEE(M
     1) - ZEE(M+1)) * ( ZEE(M  ) - ZEE(M+2)))+ F(M+1) * ((ZEE(M+1) - ZEE
     2(M+2)) / (ZEE(M) - ZEE(M+1))) * ( ZEE(M+2) + 2. *ZEE(M+1) - 3.*ZEE
     3(M)) + F(M+2) * ((ZEE(M+1) - ZEE(M+2)) / (ZEE(M) - ZEE(M+2)))* (ZE
     4E(M+1) + 2. * ZEE(M+2) - 3. * ZEE(M)))/6.0
 1450 CØNTINUE                                                          G3DC3280
      ANØM =0.5*(DEL(MØ+1)+DELP(MP))                                    G3DC3290
      ANØM1=0.5*(BEL(MØ+1)+BELP(MP))                                    G3DC3300
      PANØM=0.5*(PDEL(MØ+1)+PDELP(MP))
      DØ1460M=MØ,MP                                                     G3DC3310
      ANØM = ANØM + 0.5* (DEL(M) + DELP(M))                             G3DC3320
      ANØM1= ANØM1+ 0.5* (BEL(M) + BELP(M))                             G3DC3330
      PANØM=PANØM+0.5*(PDEL(M)+PDELP(M))
       GG(M)=ANØM-0.5*DELP(MP)                                          G3DC3340
 1460 CØNTINUE                                                          G3DC3350
        IF(K-1) 1451,1451,1454                                          G3DC3360
 1451   IF(KFG) 1453,1454,1454                                          G3DC3370
 1453   RFG=ANØM                                                        G3DC3380
 1454   GG(MØ)=0.0                                                      G3DC3390
      GG(MØ+1)=0.0                                                      G3DC3400
      GG(MP)=GG(MP)+0.5*DELP(MP)                                        G3DC3410
        DØ 1471 M=MØ,MP                                                 G3DC3420
        ZZEE(M)=ZEE(M)                                                  G3DC3430
        RHØZ=RHØZ + RHØ(M)*(ZZEE(M)-ZZEE(M-1))*SIGMA(M)                 G3DC3440
        RHCZ=RHCZ+(ZZEE(M)-ZZEE(M-1))*SIGMA(M)                          G3DC3450
       IF(M-MØ)1532,1532,1533
 1532  RHØZ=0;   RHCZ=0
 1533  CØNTINUE
      WRITE (IØUT,1470)             MID(M), III(M), ZEE(M), RHØ(M), SIGMAG3DC3460
     1 (M),RHØ(M)*SIGMA(M)*(ZZEE(M)-ZZEE(M-1))/PIE,V(M),DELP(M),DEL(M)  G3DC3470
 1471   CØNTINUE                                                        G3DC3480
 1470 FØRMAT (42H                                             I2,I5,E1G3DC3490
     10.3,F8.2,F12.7,F12.5,F12.6,2E12.4)
      PANØM=PANØM/980.
C      PANØM IS THE PØTENTIAL   PANØM/980 IS THE HEIGHT IN METERS
      WRITE(IØUT,1480)ANØM,ANØM-RFG,ANØM-RFG-FAG,FAG,ANØM1,RHØZ/PIE-RFW,G3DC3510
     1 PANØM*.3086,PANØM,RHCZ/PIE-RFW
      SØM=SØM+ANØM                                                      G3DC3530
      SØM1=SØM1+ANØM1                                                   G3DC3540
      SØM2 = PANØM+SØM2
      SHØZ=SHØZ+RHØZ; SHCZ=SHCZ+RHCZ                                    G3DC3550
 1501 IF(BDC-BD) 1502,1502,1062                                         G3DC3560
 1502  WRITE(IØUT,1503)  SØM,SØM-RFG,SØM-RFG-FAG,FAG,SØM1,              G3DC3570
     1SHØZ/PIE-RFW,SØM2*.3086,SØM2,SHCZ/PIE-RFW
 1503 FØRMAT(///,'      *****  THESE ARE THE FINAL SUMS  *****',/,      G3DC3590
     1/,'CURVED ANØMALY= 'E12.4,'   REFER ANØMALY= 'E12.4,
     2'   RESID ANØMALY= 'E12.4,'   ØBSER ANØMALY= 'E12.4,/,           G3DC3610
     3'  FLAT ANØMALY= 'E12.4,T54,'WEIGHT= ',E12.7,/
     4'  FLAT SEASURF= ',E12.6,'  HEIGHT METERS=',E14.6,T91,'WEIGHTEST'
     5'= ',E12.4)
 1480   FØRMAT(' '//,'CURVED ANØMALY= 'E12.4,'   REFER ANØMALY= 'E12.4,  G3DC364
     1 '   RESID ANØMALY= 'E12.4,'   ØBSER ANØMALY= 'E12.4,/,'  FLAT ',
     2'ANOMALY= ',E12.4,T94,'WEIGHT= ',E12.4,/
     3'  FLAT SEASURF= ',E12.6,'  HEIGHT METERS=',E14.6,T91,'WEIGHTEST'
     4'* ',E12.4)
      IF(PUN)390,7171,390                                               G3DC3670
390   WRITE(IOUT,400)  (V(M),M=MB,MP)                                   G3DC3680
  370 FORMAT(2I4)                                                       G3DC3690
  380 FORMAT(6E12.6)                                                    G3DC3700
  400 FORMAT(6E12.6)                                                    G3DC3710
 7171 IF(GGG)14701,1500,14701                                           G3DC3720
14701 WRITE(IOUT,14702)            (GG(M),M=MB,MP)                      G3DC3730
      IF(PUN)1473,1500,1473                                             G3DC3740
 1473 WRITE(IOUT,400)         (GG(M),M=MRS,MP)                          G3DC3750
14702 FORMAT(1H 9E12.4)                                                 G3DC3760
 1500  IF(LDP)1070,1070,1520                                            G3DC3770
 1510 IF(J)1000,1520,1000                                               G3DC3780
1520  CONTINUE                                                          G3DC3790
      END                                                               G3DC3800
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                          HEX     DEC                              HEX     DEC                              HEX     DEC
NAME    TYPE CLASS        LØC     WØRDS   NAME    TYPE CLASS        LØC     WØRDS   NAME    TYPE CLASS        LØC     WØRDS
----    ---- -----      -------   -----   ----    ---- -----      -------   -----   ----    ---- -----      -------   -----
A          R SCALR      0000E V       1   AA         R SCALR      0000F V       1   ABS        R SPRØG      INTRIN
ABSF       R SPRØG      INTRIN            ALPH1      R SCALR      00010 V       1   ALPH2      R SCALR      00011 V       1
ANØM       R SCALR      00012 V       1   ANØM1      R SCALR      00013 V       1   ATANF      R SPRØG      EXTERN
AUX        R SCALR      00082 V       1   B          R SCALR      00014 V       1   BB         R SCALR      00015 V       1
ØD         I SCALR      0000A V       1   BDC        R SCALR      00016 V       1   BEL        R ARRAY      0040D C     102
ØELP       R ARRAY      009A7 C     102   BETA1      R SCALR      00017 V       1   BETA2      R SCALR      00018 V       1
EG         R SCALR      00019 V       1   C          R SCALR      0001A V       1   CC         R SCALR      0001B V       1
CØØRR        SPRØG      EXTERN            D          R SCALR      0001C V       1   DBLE       D SPRØG      INTRIN
DCØS       C SPRØG      INTRIN            DEL        R ARRAY      0089F C     102   DELP       R ARRAY      00905 C     102
DELT1      R SCALR      0001D V       1   DELT2      R SCALR      0001E V       1   DØC        R SCALR      0001F V       1
DØGG       R SCALR      00020 V       1   DØGGS      R SCALR      00021 V       1   DØGS       R SCALR      00022 V       1
DRA        D SCALR      00002 V       2   DSIN       D SPRØG      INTRIN            DSQRT      D SPRØG      INTRIN
DUM        R SCALR      00089 V       1   DZZ        D SCALR      00004 V       2   E          R ARRAY      00473 C     102
EGA        R SCALR      00023 V       1   ELEV       R SCALR      00024 V       1   EMM        R SCALR      00025 V       1
F          R ARRAY      028AB C     102   FAG        R SCALR      00026 V       1   FELZ       R SCALR      00027 V       1
FX         R SCALR      00028 V       1   FY         R SCALR      00029 V       1   FZ         R SCALR      0002A V       1
GAMM1      R SCALR      0002B V       1   GAMM2      R SCALR      0002C V       1   GG         R ARRAY      00599 C     102
GGG        R SCALR      00085 V       1   GINØT        SPRØG      EXTERN            GM         R SCALR      0002D V       1
I          I SCALR      0000B V       1   IA         I ARRAY      00384 C      35   IBEGG      I SCALR      0002E V       1
IDEP       I SCALR      0002F V       1   IDIF       I SCALR      00030 V       1   IELC       I SCALR      00031 V       1
IFBC       I SCALR      00032 V       1   IFFC       I SCALR      00033 V       1   IGC        I SCALR      00034 V       1
II         I SCALR      00035 V       1   III        I ARRAY      0063B C     102   IMM        I ARRAY      0061D C      30
IN         I SCALR      00036 V       1   INCARD     I SCALR      00037 V       1   INIT       I SCALR      00038 V       1
IØUT       I SCALR      00039 V       1   IRMA       I SCALR      0003A V       1   ISØRC      I SCALR      0003B V       1
ISW        I SPRØG      EXTERN            ITAPE      I SCALR      0003C V       1   ITST       I SCALR      0003D V       1
J          I SCALR      0000C V       1   JTAPE      I SCALR      0003E V       1   JTST       I SCALR      0003F V       1
K          I SCALR      0000D V       1   KDA        I SCALR      00040 V       1   KGHM       I SCALR      00041 V       1
KGMØ       I SCALR      00042 V       1   KGYR       I SCALR      00043 V       1   KJ         I SCALR      00044 V       1
KK         I SCALR      00045 V       1   K977       I SCALR      00046 V       1   L          I SCALR      00047 V       1
LBP        I SCALR      00088 V       1   LDP        I SCALR      00048 V       1   LØG        R SPRØG      INTRIN
LPT        I SCALR      0008A V       1   M          I SCALR      00049 V       1   MID        I ARRAY      007D3 C     102
MM         I SCALR      0004A V       1   MN         I SCALR      0004B V       1   MØ         I SCALR      0004C V       1
MP         I SCALR      0004D V       1   MG         I SCALR      00087 V       1   MRS        I SCALR      0004E V       1
MUM        I SCALR      0004F V       1   NGG        I SCALR      00050 V       1   NGØ `      I SCALR      00051 V       1
ØBSG       R SCALR      00052 V       1   P          R SCALR      00053 V       1   PANØM      R SCALR      00054 V       1
PARFEZ     R SCALR      00055 V       1   PB         R SCALR      00056 V       1   PC         R SCALR      00057 V       1
PDEL       R ARRAY      02911 C     102   PDELP      R ARRAY      02977 C     102   PDENS      R SCALR      00058 V       1
PFELZ      R SCALR      00059 V       1   PIE        R SCALR      0005A V       1   PLANET       SPRØG      EXTERN
PMASS      R SCALR      0005B V       1   PSFELZ     R SCALR      0005C V       1   PSI        R S-ALR      0005D V       1
PLN        R SCALR      00086 V       1   RA         R SCALR      0005E V       1   RFA        R SCALR      0005F V       1
RFD        R SCALR      0008C V       1   RFG        R SCALR      00081 V       1   RFW        R SCALR      0007F V       1
RHCZ       P SCALR      00060 V       1   RHØ        R ARRAY      006A1 C     102   RHØZ       R SCALR      00061 V       1
RKM        R SCALR      00062 V       1   RLAT       R SCALR      00063 V       1   RLØNG      R SCALR      00064 V       1
RVAR       R SCALR      00065 V       1   RVDR       D SCALR      00000 V       2   R1         R SCALR      00066 V       1
R2         R SCALR      00067 V       1   R3         F SCALR      00068 V       1   S          R SCALR      00069 V       1
SFELZ      R SCALR      0006A V       1   SHCZ       R SCALR      0006B V       1   SHØZ       R SCALR      0006C V       1
SIGA       R SCALR      0006D V       1   SIGMA      R ARRAY      004D9 C     102   SIN        R SPRØG      INTRIN
SNGL       R SPRØG      INTRIN            SØM        R SCALR      0006E V       1   SØM1       R SCALR      0006F V       1
SØM2       R SCALR      00070 V       1   SQRT       R SPRØG      INTRIN            SQRTF      R SPRØG      EXTERN
SS         R SCALR      00071 V       1   STAT         SPRØG      EXTERN            STV        R SCALR      00072 V       1
T          R SCALR      00073 V       1   TAU        R SCALR      00074 V       1   TC         R SCALR      00075 V       1
TS         R SCALR      00076 V       1   TT         D SCALR      00006 V       2   TU         R SCALR      00077 V       1
TV         R SCALR      00078 V       1   TX         D SCALR      00008 V       2   U          R SCALR      00079 V       1
UIII       R ARRAY      00320 C     200   UMIC       R ARRAY      00258 C     200   URHØ       R ARRAY      000C8 C     200
UT         R ARRAY      0057B C      30   UU         R ARRAY      0053F C      30   UZEE       R ARRAY      00190 C     200
UZT        R ARRAY      005FF C      30   UZU        R ARRAY      0055D C      30   V          R ARRAY      00839 C     102
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VT          R SCALR  00084 V     1      VU          R SCALR  00083 V     1      W           R SCALR  0007A V     1
X           R ARRAY  0096B C  4000      XX          R ARRAY  00320 C    50      Y           R ARRAY  01908 C  4000
YY          R ARRAY  00352 C    50      Z           R SCALR  0007B V     1      ZEE         R ARRAY  00707 C   102
ZT          R SCALR  0007C V     1      ZU          R SCALR  0007D V     1      ZZ          R SCALR  0007E V     1
ZZEE        R ARRAY  0076D C   102

        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
    1   0044D         3   00278         4   00299         5   0027B         6   00283        12   002B2
   17   0047C        18   004A3        20   00024        21   00033        22   0003A        23   0004F
   24   0004D        25   00067        26   00065        27   00063        28   00070       201   0079E
  202   007D0       203   007A5       204   007A9       205   007A1       206   007BD       207   007B8
  208   007CC       300   0039C       310   00392       320   0039F       330   003A1       340   003A3
  350   003B5       360   003B7       370   00B11       380   00B14       390   00B03       400   00B17
  943   00229      1000   001BE      1001   001F1      1002   00211      1003   001F7      1020   001CD
 1021   001E5      1023   00485      1025   00235      1030   0024A      1031   0026A      1040   002AC
 1041   00295      1050   002B3      1051   002CE      1052   002E9      1053   0031D      1054   0034D
 1055   003C7      1056   0033D      1060   003C3      1061   003C1      1062   004AB      1063   00374
 1064   00389      1070   003C4      1072   00499      1075   003FD      1077   00490      1078   0043C
 1079   004BE      1090   004ED      1100   00506      1105   0050C      1110   0050E      1112   0051D
 1115   0054A      1120   0056C      1130   00572      1140   00574      1150   00596      1160   00599
 1170   00598      1180   005A2      1190   005A5      1200   005AB      1210   005AA      1220   005C5
 1225   005C9      1230   005DA      1240   005E9      1250   005FB      1260   005FE      1270   00601
 1280   00604      1290   00614      1300   0061F      1310   00622      1320   00625      1330   00628
 1340   00638      1341   00689      1350   00694      1351   00593      1360   006A0      1370   006A2
 1380   006A7      1385   006CF      1390   006DF      1392   0073D      1393   00743      1394   00758
 1395   0076C      1396   00780      1398   006F9      1400   0078B      1410   00795      1420   0079B
 1430   007E0      1432   0081E      1440   0084B      1450   00985      1451   00989      1453   009BB
 1454   009BD      1460   009B2      1470   00A07      1471   00A02      1473   00B2C      1480   00AC4
 1500   00B3E      1501   00A54      1502   00A58      1503   00A7C      1504   003D9      1510   00B41
 1520   00B43      1532   009DA      1533   009DE      1600   007E6      1610   007F9      1620   007F8
 1630   007FD      1632   00B1C      2021   007AC      2022   007B0      2023   007B3      2024   007C0
 2025   007C7      2026   007C4      7171   00B1A      9998   006CC     12101   005AC     12102   005BB
12401   005F0     12402   005EB     14701   00B1C     14702   00B3A

LØCAL VARIABLES (139 WØRDS):

   00000 RVDR          00002 DRA           00004 DZZ           00006 TT            00008 TX            0000A BD
   0000B I             0000C J             0000D K             0000E A             0000F AA            00010 ALPH1
   00011 ALPH2         00012 ANØM          00013 ANØM1         00014 B             00015 BB            00016 BDC
   00017 BETA1         00018 BETA2         00019 BG            0001A C             0001B CC            0001C D
   0001D DELT1         0001E DELT2         0001F DØG           00020 DØGG          00021 DØGGS         00022 DØGS
   00023 EGA           00024 ELEV          00025 EMM           00026 FAG           00027 FEL7          00028 FX
   00029 FY            0002A FZ            0002B GAMM1         0002C GAMM2         0002D GM            0002E IBEGG
   0002F IDEP          00030 IDIF          00031 IELC          00032 IFBC          00033 IFFC          00034 IGC
   00035 II            00036 IN            00037 INCARD        00038 INIT          00039 IØUT          0003A IRMA
   0003B ISØRC         0003C ITAPE         0003D ITST          0003E JTAPE         0003F JTST          00040 KDA
   00041 KGHM          00042 KGYØ          00043 KGYR          00044 KJ            00045 KK            00046 K977
   00047 L             00048 LDP           00049 M             0004A MM            0004B MN            0004C MØ
   0004D MP            0004E MRS           0004F MUM           00050 NGG           00051 NGØ           00052 ØBSG
   00053 P             00054 PARØM         00055 PARFEZ        00056 PB            00057 PC            00058 PDENS
   00059 PFELZ         0005A PIF           0005B PMASS         0005C PSFELZ        0005D PSI           0005E RA
   0005F RFA           00060 RHCZ          00061 RHØZ          00062 RKM           00063 RLAT          00064 RLØNG
   00065 RVAR          00066 R1            00067 R2            00068 R3            00069 S             0006A SFELZ
   0006B SHCZ          0006C SHØZ          0006D SIGA          0006E SØM           0006F SØM1          00070 SØM2
   00071 SS            00072 STV           00073 T             00074 TAU           00075 TC            00076 TS
   00077 TU            00078 TV            00079 U             0007A W             0007B Z             0007C ZT
```

```
    0007C ZU        0007E ZZ        0007F RFW       00080 RFD       00081 RFG       00082 AUX
    00083 VU        00084 VT        00085 GGG       00086 PUN       00087 MQ        00088 LBP
    00089 DUM       0008A LPT

BLANK C8MM8N (10717 W8RDS):

    00000 UIII      000C8 URH8      00190 UZEE      00258 UMID      00320 XX        00352 YY
    00384 IA        003A7 BELP      004CD BEL       00473 E         004D9 SIGMA     0053F UU
    0055D UZU       00576 UT        00599 GG        005FF UZT       0061D IMM       0063B III
    006A1 RH8       00707 ZEE       0076D ZZEE      007D3 MID       00839 V         0089F DEL
    00905 DELP      00968 X         0190B Y         028AB F         02911 PDEL      02977 PDELP

INTRINSIC SUBPR8GRAMS USED:

    ABS       ABSF      D8LE      DC8S      DSIN      DSQRT     L8G       SIN
    SNGL      SQRT

EXTERNAL SUBPR8GRAMS REQUIRED:

    ATANF     C8RRR     GIN8T     ISW       PLANET    SQRTF     STAT      F:101
    F:102     F:103     F:104     F:105     F:106     F:108     MID8      M:8C
    9AL8G     9BCDREAD  9BCDWRIT  9DC8S     9DSIN     9DSQRT    9DT8R     9END18L
    9INITIAL  9I8DATA   9IT8R     9PRINT    9RT8I     9SIN      9SQRT     9ST8P

HIGHEST ERR8R SEVERITY: 0 (N8 ERR8RS)

                     DEC       HEX
                    W8RDS     W8RDS
                    -----     -----
  GENERATED C8DE:    2885     00B45
       C8NSTANTS:      38     00026
 L8CAL VARIABLES:     139     0008B
           TEMPS:      12     0000C
                    -----     -----
   T8TAL PR8GRAM:    3074     00C02    (PLUS BLANK C8MM8N)
```

```
C      PRØGRAM G3DC PREP
C        VERSIØN 5 FEB 75 TØ USE REFERENCE DENSITY
C      VERSIØN ØF 23 MAY 74 TØ INCREASE RESØLUTIØN ØF Z
C      VERSIØ 1 MAR 74 TØ RENUMBER LAMINAE
C      PRØGRAM TØ PREPARE I/P TØ G3D
       DIMENSIØN ICARD(80),NSL(10)
        DIMENSIØN REFD(10)
       ØUTPUT 'G3DCPREP VERSIØN 5 FEB 75'
       LBP=1
       ITAPE=0
       JTAPE=7
       IIN=105
   100 READ(IIN,1004) NUMBØD
       DØ 105 I=1,NUMBØD
       READ(IIN,1006) REFD(I)
   105 CØNTINUE
       DØ 110 I=1,NUMBØD
       READ(13,1004) NSLCNT
       NSL(I)=NSLCNT
   110 CØNTINUE
       DØ 500 I=1,NUMBØD
       NCNTP=0
       ITAPE=ITAPE+1
       IF(I.EQ.NUMBØD) WRITE(JTAPE,1005) NSL(I),LBP ; GØ TØ 130
       WRITE(JTAPE,1004) NSL(I)
   130 CØNTINUE
   170 READ(ITAPE,1002,END=400) NCNT,RHØ,Z
       NCNTP=NCNTP+1
       RHØ=RHØ*REFD(I)
       WRITE(JTAPE,1002) NCNTP,RHØ,Z
   180 READ(ITAPE,1003) X,Y,LSLPT
       WRITE(JTAPE,1003) X,Y,LSLPT
       IF(LSLPT.NE.1) GØ TØ 180
       GØ TØ 170
   400 CØNTINUE
   500 CØNTINUE
       STØP
C      ********
C      FØRMATS
C      ******
  1001 FØRMAT(80A1)
  1002 FØRMAT(I2,F10.4,F16.6,F6.3)
  1003 FØRMAT(2F12.5,I1)
  1004 FØRMAT (I2)
  1005 FØRMAT(I2,28X,I1)
  1006 FØRMAT(F10.0)
       END
```

```
NAME   TYPE CLASS    HEX    DEC        NAME   TYPE CLASS    HEX    DEC        NAME   TYPE CLASS    HEX    DEC
                     LOC    WORDS                           LOC    WORDS                           LOC    WORDS
----   ---- -----  -------  -----      ----   ---- -----  -------  -----      ----   ---- -----  -------  -----
I         I SCALR  00069 V      1      ICARD     I ARRAY  00000 V     80      IIN       I SCALR  00067 V      1
ITAPE     I SCALR  00065 V      1      JTAPE     I SCALR  00066 V      1      LBP       I SCALR  00064 V      1
LSLPT     I SCALR  00071 V      1      NCNT      I SCALR  0006C V      1      NCNTP     I SCALR  0006B V      1
NSL       I ARRAY  00050 V     10      NSLCNT    I SCALR  0006A V      1      NUMBOD    I SCALR  00068 V      1
REFC      R ARRAY  0005A V     10      RHO       R SCALR  0006D V      1      X         R SCALR  0006F V      1
Y         R SCALR  00070 V      1      Z         R SCALR  0006E V      1

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
  100   00015      105   00022      110   00031      130   0004B      170   0004B      180   00060
  400   00072      500   00072     1001   00079     1002   0007C     1003   00083     1004   00087
 1005   00089     1006   0008D

LOCAL VARIABLES (114 WORDS):

  00000 ICARD      00050 NSL        0005A REFC       00064 LBP        00065 ITAPE      00066 JTAPE
  00067 IIN        00068 NUMBOD     00069 I          0006A NSLCNT     0006B NCNTP      0006C NCNT
  0006D RHO        0006E Z          0006F X          0007C Y          00071 LSLPT

BLANK COMMON (0 WORDS)

EXTERNAL SUBPROGRAMS REQUIRED:

  F:101     F:102     F:103     F:104     F:105     F:106     F:108     M:DO
  M:OC      9BCDRDEE  9BCDREAD  9BCDWRIT  9ENDIOL   9INITIAL  9IODATA   9PRINT
  9STOP

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                    DEC     HEX
                   WORDS   WORDS
                   -----   -----
 GENERATED CODE:    146    00092
      CONSTANTS:      0    00000
LOCAL VARIABLES:    114    00072
          TEMPS:      0    00000
                   -----   -----
 TOTAL PROGRAM:     260    00104
```

```
      C      PRØGRAM HIG
      C      FØR INITIAL CØNVERSIØN ØF H.I.G. GRAVITY DATA TØ WHØI GSUM
      C      INITIAL VERSIØN BASED ØN PRØGRAM DMA
      C      INITIAL VERSIØN 1 DECEMBER 1973
             DIMENSIØN IA(35),NAME(80)
             DIMENSIØN IZ(9), IW(35)
             DATA IS/'   S'/
             DATA IWE/'   W'/
             ITAPE=1
             JTAPE=2
             IIN=105
             IØUT=108
             ØUTPUT 'PRØGRAM HIG  VERSIØN 2 DEC 73'
             CALL STAT
             J=ISW(-2)
             DEGRA=1.745329E-2
             RADEG=57.29578
             KK=0
             KI=1
             KØ=-2
      C      DENS=2.67-1.03
             DENS=1.64
             NREC=0
             ELEV=0.
             READ(IIN,1001) ISØRC
        1001 FØRMAT(I5)
             ØUTPUT ISØRC
             CALL GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
            1             KGYR,KGHM,JDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
            2             IDEP,FA,BG,TC,WELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
             IFFC=17
             IGC=0
             IRECC=0
             IFBC=0
             READ(ITAPE,1002)IHSC,ISIGFA,ISIGBG
        1002 FØRMAT(10X,I4,I2,I2)
             READ(ITAPE,1003)(NAME(I),I=1,80)
        1003 FØRMAT(80A1)
          50 CØNTINUE
             READ(ITAPE,1004,END=999) ILØC,ITR,ISER,ISTA,ILATD,DLATM,NØRS,
            1 ILØNGD,DLØNGM,NEØRW,IELEV,NG1,NG2,IELEVKEY,IYR,IAPP,
            2 IELEVC,IELEVT,IFA
        1004 FØRMAT(I3,2A2,I4,1X,I2,F4.2,A1,I3,F4.2,A1,I7,I3,I5,
            1          I1,I2,3I1,13X,I6)
      C      CHECKING APPARATUS CØDE
             NAPP=IAPP+1
             GØ TØ (510,510,510,510,550,510) NAPP
         510 ØUTPUT 'APPARATUS CØDE NØT IMPLIMENTED'
         550 CØNTINUE
             DELEV=FLØAT(IELEV)*.1
             IF(IELEVKEY.EQ.0.AND.IELEVC.NE.4) ELEV=DELEV; GØ TØ 560
             IDEP=DELEV
      DEP=FLØAT(IDEP)
  560 CØNTINUE
      DLATM=DLATM/60.
      DLATD=FLØAT(ILATD)
      DLAT=DLATD+DLATM
      IF(NØRS.EQ.IS) DLAT=-DLAT
      DLØNGM=DLØNGM/60
      DLØNGD=FLØAT(ILØNGD)
      DLØNG=DLØNGD+DLØNGM
      IF(NEØRW.EQ.IWE) DLØNG=-DLØNG
      FA=FLØAT(IFA)*.1
      BG=FA+(.04185*DENS*DEP)
      ZG1=FLØAT(NG1)*1000.
      ZG2=FLØAT(NG2)*.01
      K977=NG1
      ØBSG=ZG2
      KGHM=ISTA
      KGYR=IYR
      ENCØDE(35,1005,IZ)IHSC,ISIGFA,ISIGBG,ILØC,ITR,ISER,IAPP,IELEVC,
     1          IELEVT
 1005 FØRMAT(I4,2I2,I3,2A2,3I1)
      CALL UNPKBY(IZ,IW,35)
      DØ 420 J=1,35
      IA(J)=ISL(IW(J),24)
  420 CØNTINUE
  500 CONTINUE
      RLAT=DLAT*DEGRA;RLØNG=DLØNG*DEGRA
      CALL  GINØT(ITAPE,JTAPE,K0,KGDA,KGMØ,KGYR,KGHM,IDIF,ISØRC,
     1                RLAT,RLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,
     2          .        TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFHC)
      NREC=NREC+1
      GØ TØ 50
C
C     END ØF FILE
C
  999 CØNTINUE
      ENDFILE  JTAPE
      ØUTPUT NREC
      ØUTPUT 'ALL DØNE'
      STØP
      END
```

```
                        HEX     DEC                                 HEX     DEC                                  HEX     DEC
NAME    TYPE CLASS      LØC     WØRDS    NAME     TYPE CLASS      LØC     WØRDS    NAME      TYPE CLASS      LØC     WØRDS
----    ---- -----    -------   -----    ----     ---- -----    -------   -----    ----      ---- -----    -------   -----
BG         R SCALR    000BA V       1    DEGRA       R SCALR    000A6 V       1    DELEV        R SCALR    000DA V       1
DENS       R SCALR    000AB V       1    DEP         R SCALR    000DB V       1    DLAT         R SCALR    000DD V       1
DLATD      R SCALR    000DC V       1    DLATM       R SCALR    000CB V       1    DLØNG        R SCALR    000DF V       1
DLØNGD     R SCALR    000DE V       1    DLØNGM      R SCALR    000CE V       1    ELEV         R SCALR    000AD V       1
FA         R SCALR    000E9 V       1    FLØAT       R SPRØG    INTRIN             GINØT          SPRØG    EXTERN
I          I SCALR    000C5 V       1    IA          I ARRAY    00000 V      35    IAPP         I SCALR    000D5 V       1
ICEF       I SCALR    000E8 V       1    IDIF        I SCALR    000E2 V       1    IELC         I SCALR    000E3 V       1
IELEV      I SCALR    000D0 V       1    IELEVC      I SCALR    000D6 V       1    IELEVKEY     I SCALR    000D3 V       1
IELEVT     I SCALR    000D7 V       1    IFA         I SCALR    000D8 V       1    IFBC         I SCALR    000C1 V       1
IFFC       I SCALR    000C0 V       1    IGC         I SCALR    000BD V       1    IHSC         I SCALR    000C2 V       1
IIN        I SCALR    000A3 V       1    ILATD       I SCALR    000CA V       1    ILØC         I SCALR    000C6 V       1
ILØNGC     I SCALR    000CD V       1    IØUT        I SCALR    000A4 V       1    IREGC        I SCALR    000BF V       1
IS         I SCALR    0009F V       1    ISER        I SCALR    000C8 V       1    ISIGBG       I SCALR    000C4 V       1
ISIGFA     I SCALR    000C3 V       1    ISL         I SPRØG    INTRIN             ISØRC        I SCALR    000AE V       1
ISTA       I SCALR    000C9 V       1    ISW         I SPRØG    EXTERN             ITAPE        I SCALR    000A1 V       1
ITR        I SCALR    000C7 V       1    IW          I ARRAY    0007C V      35    IWE          I SCALR    000A0 V       1
IYR        I SCALR    000D4 V       1    IZ          I ARRAY    00073 V       9    J            I SCALR    000A5 V       1
JDIF       I SCALR    000B3 V       1    JELC        I SCALR    000BC V       1    JTAPE        I SCALR    000A2 V       1
KGDA       I SCALR    000AF V       1    KGHM        I SCALR    000E2 V       1    KGMØ         I SCALR    000B0 V       1
KGYR       I SCALR    000B1 V       1    KI          I SCALR    000A9 V       1    KK           I SCALR    000A8 V       1
K9         I SCALR    000AA V       1    K977        I SCALR    000B6 V       1    NAME         I ARRAY    00023 V      80
NAPP       I SCALR    000C9 V       1    NEØRW       I SCALR    000CF V       1    NG1          I SCALR    000D1 V       1
NG2        I SCALR    000D2 V       1    NØRS        I SCALR    000CC V       1    NREC         I SCALR    000AC V       1
ØBSG       R SCALR    000B7 V       1    RADEG       R SCALR    000A7 V       1    RFA          R SCALR    000BE V       1
RLAT       R SCALR    000E4 V       1    RLØNG       R SCALR    000B5 V       1    STAT           SPRØG    EXTERN
TC         R SCALR    000BB V       1    UNPKBY        SPRØG    EXTERN             ZG1          R SCALR    000E0 V       1
ZG2        R SCALR    000E1 V       1


        HEX             HEX             HEX             HEX             HEX             HEX
LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC
-----  -----    -----  -----    -----  -----    -----  -----    -----  -----    -----  -----
   50  0007B      420  00128      500  0012A      510  000B3      550  000C0      560  000D2
  990  0014D     1001  00031     1002  00066     1003  00078     1004  00094     1005  00117


LØCAL VARIABLES (228 WØRDS):

   00000 IA          00023 NAME        00073 IZ          0007C IW          0009F IS          000A0 IWE
   000A1 ITAPE       000A2 JTAPE       000A3 IIN         000A4 IØUT        000A5 J           000A6 DEGRA
   000A7 RADEG       000A8 KK          000A9 KI          000AA K9          000AB DENS        000AC NREC
   000AD ELEV        000AE ISØRC       000AF KGDA        000B0 KGMØ        000B1 KGYR        000B2 KGHM
   000B3 JDIF        000B4 RLAT        000B5 RLØNG       000B6 K977        000B7 ØBSG        000B8 ICEF
   000B9 FA          000BA BG          000BB TC          000BC JELC        000BD IGC         000BE RFA
   000BF IREGC       000C0 IFFC        000C1 IFBC        000C2 IHSC        000C3 ISIGFA      000C4 ISIGBG
   000C5 I           000C6 ILØC        000C7 ITR         000C8 ISER        000C9 ISTA        000CA ILATD
   000CB DLATM       000CC NØRS        000CD ILØNGC      000CE DLØNGM      000CF NEØRW       000D0 IELEV
   000D1 NG1         000D2 NG2         000D3 IELEVKEY    000D4 IYR         000D5 IAPP        000D6 IELEVC
   000D7 IELEVT      000D8 IFA         000D9 NAPP        000DA DELEV       000DB DEP         000DC DLATD
   000DC DLAT       000DE DLØNGD     000DF DLØNG      000E0 ZØ1        000E1 ZØ2        000E2 IDIF
   000E3 IELC

BLANK CØMMØN (0 WØRDS)

INTRINSIC SUBPRØGRAMS USED:

   FLØAT      ISL

EXTERNAL SUBPRØGRAMS REQUIRED:

   GINØT      ISA        STAT       UNPKBY     F:101      F:103      F:105      F:108
   M:DB       M:BC       9BCDRDEE   9BCDREAD   9ENCØDE    9ENDFILE   9ENDIØL    9INITIAL
   9IØDATA    9ITØR      9PRINT     9RTØI      9STØP

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC       HEX
                   WØRDS     WØRDS
                   -----     -----
  GENERATED CØDE:    354     00162   (NØ MEMØRY PRØTECTIØN)
       CØNSTANTS:     10     0000A
 LØCAL VARIABLES:    228     000E4
           TEMPS:      0     00000
                   -----     -----
   TØTAL PRØGRAM:    592     00250
 1.   C       PROGRAM LSORT
 2.   C       PROGRAM TO SORT AND EDIT LUNL O/P
 3.   C       VERSION 29 APRIL 75 TO CHANGE TEST IN LINE 21
 4.   C       VERSION OF 23 MAY 74 TO INCREASE RESOLUTION OF Z
 5.   C       VERSIθN θF 29 MAR 74 Tθ MAKE BETTER EθF CHECK
 6.   C       VERSIθN 1 MAR 74 Tθ SθP IF ISLCNT GT 20
 7.   C       θRIGINAL VWRSIθN 21 FEB 74
 8.           ITAPE=0
 9.           JTAPE=6
10.           KTAPE=15
11.           IIN=105
12.           θUTPUT 'PRθGRAM LSθRT VERSIθN θF 29 APRIL 75'
13.           READ(IIN,1004) ZLIM
14.           θUTPUT ZLIM
15.           READ(IIN,1001) NUMBθD
16.           Dθ 500 I=1,NUMBθD
17.           ITAPE=ITAPE+1
18.           JTAPE=JTAPE+1
19.           ISLCNT=0
20.           ZST=999.0
21.        70 READ(ITAPE,1002,END=400) NCNT,RHθ,Z
22.           IF(Z.EQ.0.0.AND.ISLCNT.NE.0.AND.RHθ.EQ.0.0) Gθ Tθ 400
23.           ZCHK=ABS(Z-ZST)
24.           IF(ZCHK.LT.ZLIM)  Gθ Tθ 600
25.           ZST=Z
26.           ISLCNT=ISLCNT+1
27.           IF(ISLCNT.GT.20) θUTPUT 'Tθθ MANY LANIMAL',ISLCNT,I; Gθ Tθ 999
28.           WRITE(JTAPE,1002) NCNT,RHθ,Z
29.        80 READ(ITAPE,1003) X,Y,LSLPT
30.           WRITE(JTAPE,1003) X,Y,LSLPT
31.           IF(LSLPT.NE.1) Gθ Tθ 80
32.           Gθ Tθ 70
33.       400 WRITE (KTAPE,1001) ISLCNT
34.       500 CθNTINUE
35.           Gθ Tθ 999
36.       600 CθNTINUE
37.           READ(ITAPE,1003) X,Y,LSLPT
38.           IF (LSLPT.EQ.1) Gθ Tθ 70
39.           Gθ Tθ 600
40.       999 STθP
41.   C       *****
42.
43.   C       FθRMATS
44.   C       *****
45.      1001 FθRMAT (I2)
46.      1002 FθRMAT(I2,F10.4,F16.6,F6.3)
47.      1003 FθRMAT(2F12.5,I1)
48.      1004 FθRMAT (F10.0)
49.           END
```

```
                      HEX     DEC                              HEX     DEC                              HEX     DEC
NAME    TYPE CLASS    LOC     WORDS       NAME   TYPE CLASS    LOC     WORDS       NAME   TYPE CLASS    LOC     WORDS
----    ---- -----  -------   -----       ----   ---- -----  -------   -----       ----   ---- -----  -------   -----
ABS        R SPROG  INTRIN                I         I SCALR  00006 V      1        IIN       I SCALR  00003 V      1
ISLCNT     I SCALR  00007 V      1        ITAPE     I SCALR  00000 V      1        JTAPE     I SCALR  00001 V      1
KTAPE      I SCALR  00002 V      1        LSLPT     I SCALR  0000F V      1        NCNT      I SCALR  00009 V      1
NUMBOD     I SCALR  00005 V      1        RHO       R SCALR  0000A V      1        X         R SCALR  0000D V      1
Y          R SCALR  0000E V      1        Z         R SCALR  0000B V      1        ZCHK      R SCALR  0000C V      1
ZLIM       R SCALR  00004 V      1        ZST       R SCALR  00008 V      1

         HEX               HEX               HEX               HEX               HEX               HEX
LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
   70   00034        80   00069       400   00078       500   00080       600   00086       999   00091
 1001   00093      1002   00095      1003   0009C      1004   000A0

LOCAL VARIABLES (16 WORDS):

   00000 ITAPE       00001 JTAPE       00002 KTAPE       00003 IIN         00004 ZLIM        00005 NUMBOD
   00006 I           00007 ISLCNT      00008 ZST         00009 NCNT        0000A RHO         0000B Z
   0000C ZCHK        0000D X           0000E Y           0000F LSLPT

BLANK COMMON (0 WORDS)

INTRINSIC SUBPROGRAMS USED:

   ABS

EXTERNAL SUBPROGRAMS REQUIRED:

   F:101       F:102       F:103       F:104       F:105       F:106       F:108       M:DO
   M:OC        9BCDFDEE    9BCDREAD    9BCDWRIT    9ENDIOL     9INITIAL    9IODATA     9PRINT
   9STOP

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                      DEC       HEX
                     WORDS     WORDS
                     -----     -----
 GENERATED CODE:      165      000A5
      CONSTANTS:        1      00001
LOCAL VARIABLES:       16      00010
          TEMPS:        0      00000
                     -----     -----
  TOTAL PROGRAM:      182      000B6
```

```
C       PRØGRAM MØDPLØT
C                  PLØTS DATA FØR PREPARATIØN ØF, AND CØNSTRUCTED,
C             STRUCTURE MØDELS ØF EARTH'S CRUST
C  MAKES PLØTS ØF ØUTPUT FRØM TALPLØT 15, PRØJ4, AND/ØR SAINT2
CHRIS WØØDING VERSIØN ØF 4 NØV 1975
C       VERSIØN 7 APRIL 75 TØ ZERØ VARIABLES
C       VERSIØN 24 FEB 1975, TØ ADD USE ØF PINØT AND YINØT
C       VERSIØN ØF  3 FEB 1975, SØ GINØT WILL NØT TRY TØ READ EØTP SN CARDS
C        VERSIØN ØF 11 DEC 1974, TØ ADD HANDLING ØF PRØJ4 ØUTPUT TØ 9T TAPE
C         VERSIØN ØF 26 SEPT 1974  TØ CHANGE AND IMPRØVE DØCUMENTATIØN
C          VERSIØN ØF 4 FEB 1973,  TØ CHANGE GSUM READ TØ DECIMAL DEGREES
C          VERSIØN ØF 12 ØCT 1972,  TØ CØRRECT ERRØR IN PLØTTING
C                PØLYGØN MØDEL FRØM CARDS WITH JFMT = 5
C          VERSIØN ØF 8 SEPT 1972,  TØ UPDATE SEISMICITY INPUT FØRMAT
C          VERSIØN ØF 7 SEPT 1972,  TØ CHANGE FØRMAT ØF PCS CARD
C       VERSIØN ØF 6 APRIL 1971, TØ PLØT 2-D BØUGUER ANØMALY FRØM TALPLØT
        DIMENSIØN IBUF(1000), LABEL(20)
        DIMENSIØN CXL(100),CYL(100),BGA(200),FX(200),SSELZ(200)
        DIMENSIØN DWGT(200)
        DIMENSIØN KSW(80),FZ(200)
        DIMENSIØN IDESC(6),VEL(8),THICK(8)
        DIMENSIØN BG2D(200)
        DIMENSIØN JA(10),JB(30)
         DIMENSIØN IA(35)
        DATA NNS,NEW/'S    ','W    '/
C
C   WHEN USING ØUTPUT FRØM PRØJ4 ØN MAG TAPE,
C      JFMT NUMBER CARDS MUST STILL BE INPUT ØN CARDS.
C      IF JFMT=1 AND DATA IS ØN MAG TAPE, THEN EITP CARDS HAVE TØ BE
C      INCLUDED FØR SUBRØUTINE MØUNT, FØLLØWING THE JFMT=1 CARD
C
C
C     SSW(1)=0 TØ PLØT ØNLY FRØM TALPLØT ØUTPUT TAPE
C           =1 TØ PLØT PRØJ4 DATA, INCLUDING MØDEL PØLYGØNS
C           =2 TØ PLØT BØTH TALPLØT ØUTPUT TAPE AND PRØJ4 DATA
C     SSW(2)=1 TØ PLØT BØUGUER ANØMALY IN ADDITIØN TØ THE FREE-AIR
C     SSW(3)=1 TØ PLØT HEIGHT FRØM GSUM DATA
C     SSW(4)=1 TØ PLØT ELEVATIØN, (INPUT VALUES ARE IN METERS)
C     SSW(5)=1 TØ PLØT ØBSERVED + CALC. GRAVITY
C     SSW(6)=1 TØ PLØT WEIGHT
C     SSW(7)=1 TØ PLØT CØNTR.BUTIØN ØF EACH PØLYGØN
C     SSW(8)=1 TØ PLØT 2-D BØUGUER ANØMALY IN TALPLØT ØUTPUT
C     SSW(13)=1 TØ PRINT INTERMEDIATE VALUES
C     SSW(14)=1 TØ PLØT ØNLY A DØT FØR GSUM FREE-AIR VALUES, RATHER
C               THAN A CØNTINUØUS LINE
C     SSW(30)=1 TØ READ GSUM DATA ØN 2 CARDS
C     SSW(32)=1 TØ READ SPFMT DATA ØN 2 CARDS
C     SSW(36)=1 TØ READ SEISMICITY DATA FRØM CARDS .
C
C
C   USES INCEP, EXTD, ISW ,SPLØT, SPØT,GINØT,DISAZ
C
C   INITIALIZATIØN SECTIØN
C
        CALL STAT
        RFACT=1
        I=ISW(-2)
C  SETTING SSW(31)=1 SØ GINØT WILL NØT  TRY TØ READ EØTP SERIAL NØ. CARDS
        II=ICHG(31,1)
```

```
      CALL PLOTS(IBUF,-1000)
      OUTPUT 'MODPLOT VERSION OF 4 NOV 1975'
    1 IIN=105
      IIOUT=108
      ITAPE=1
      JTAPE=2
      IGSUM=0
      L=99
      KFXN=1
      ILOOP=0
      DEGRA=1.745329E-02
      RADEG=57.29578
      IOOB = 0
      JFMT=0
      IYIN = 0
      IPIN = 0
      DO 100 I=1,200
      OGA(I)=0.0
      FX(I)=0.0
      FZ(I)=0.0
      SSELZ(I)=0.0
      DWGT(I)=0.0
      BG2D(I)=0.0
  100 CONTINUE
      AI=0.0
      AS=0
      ANGB=0.0
      DO 101 I=1,100
      CXL(I)=0.0
      CYL(I)=0.0
  101 CONTINUE
      DISTKM=0.0
      DO 102 I=1,8
      VEL(I)=0.0
      THICK(I)=0.0
  102 CONTINUE
      J1=0
      J2=0
      J3=0
      J4=0
      J5=0
      J6=0
      J7=0
      J8=0
      K1=0
      K2=0
      K3=0
      K4=0
      K5=0
      K6=0
      K7=0
      K8=0
C
C  XFACT = NUMBER KM'S/INCH IN X DIRECTION (LONG AXIS OF PLOT)
C  YFACT = NUMBER OF KM'S IN Y DIRECTION
C  XWIDE = KM WIDTH OF PLOT IN X DIRECTION
C  YWIDE = KM DEPTH OF PLOT IN Y DIRECTION
C  TOP,BOT,BLEFT,RIGT, = KM VALUE FOR THOSE
C
```

```
C               ABOVE SEA LEVEL = NEGATIVE
C     FOR OTHER CURVES THAN MODEL,  EDPTH = NEGATIVE,  ELEV = POSITIVE
C
C   BOUNDARIES OF MOD PLOT
C  ELFAC,GFAC,WFAC,PFAC,---ARE THE SCALE FACTORS FOR ELEVATION
C      (KMS/IN),GRAVITY(MGAL/IN),WEIGHT(KG/IN) AND
C  INDIVIDUAL POLYGON CONTRIBUTION (MG/IN).1
C  ELDIS,GDIS,PDIS---ARE THE DISTANCE IN INCHES OF THE
C  ORIGINS OF THE CURVES ABOVE THE ORIGINS OF THE MODEL
C  WDIS---DISTANCE OF WEIGHT CURVE BELOW BOTTOM OF MODEL
C    ORIGIN OF MODEL IN Y DIRECTION = DBOT + WDIS + (BOT/YFAC)
C
        READ(IIN,11)XFACT,YFACT,TOP,BOT,BLEFT,RIGT
   11   FORMAT(8F10.2)
        OUTPUT XFACT,YFACT,TOP,BOT,BLEFT,RIGT
        TOP=-TOP
        BOT=-BOT
        ICHAR=0
        ISTRT=0
        READ(IIN,11) ELFAC,ELDIS,GFAC,GDIS,WFAC,WDIS,PFAC,PDIS
        READ(IIN,11) HT,DBOT
C HT= CHARACTER HEIGHT MULTIPLICATION FACTOR (USED IN THE CALL TO
C      SYMBOL  FOR THE PLOTTING OF THE ANOMALY CURVES
C    IF HT IS EQUAL TO ZERO A DEFAULT VALUE OF 3 IS ASSUMED
C  DBOT IS THE DISTANCE THAT THE WEIGHT CURVE IS SUPOSED TO BE
C  PLOTTED ABOVE THE BOTTOM OF THE PLOT (RIGHT SIDE OF PLOTTER)
        OUTPUT ELFAC,ELDIS,GFAC,GDIS,WFAC,WDIS,PFAC,PDIS,HT
     1 ,DBOT
        IF(HT.EQ.0) HT=3.
        HT=HT*0.035
        XWIDE = RIGT-BLEFT
        YWIDE = TOP-BOT
        SL = (XWIDE/XFACT)*0.5
        SW = (YWIDE/YFACT)*0.5
        CALL WHERE(XORG,YORG,RFACT)
        CALL PLOT(XORG,YORG,-3)
        CALL SYMBOL (0.0,0.0,.28,9,0.,-2)
        IF(ISW(1)-1)5019,5018,5C19
 5018   INPT=105
        GO TO 5021
 5019   INPT=1
5021    READ(INPT,5022) LABEL
5022    FORMAT(20A4)
        WRITE(IIOUT,5023) LABEL
5023    FORMAT( 1X,20A4)
        CALL SYMBOL(0.,1.,0.28,LABEL,90.,80)
C  VIT=DISTANCE OF MODEL ORIGIN ABOVE BOTTOM (RIGHY) OF PAPER
        VIT=DBOT+WDIS+YWIDE/YFACT
        IF(VIT.GE.29.) OUTPUT 'PLOT TOO WIDE, WIDTH=VIT',OUTPUT VIT,
     /  STOP
        IF(BLEFT)5025,5024,5024
 5024   XT=3.0
        GO TO 5026
 5025   XT=3.0 -(BLEFT/XFACT)
 5026   CALL PLOT(XT,VIT,-3)
        XX = 0.0
        YY = 0.0
        CALL SYMBOL(0.0,0.0,0.14,9,0.0,-1)
C  CALCULATING COORDINATES OF CENTRAL POINT
        RX = (XWIDE*0.5) - (-1.0*BLEFT)
```

```
      RY = -1.0*((YWIDE*0.5)-(TØP))
C  CØNVERTING ØRIGIN TRANSLATIØN VECTØRS  TØ INCHES
      RX = RX/XFACT
      RY = RY/YFACT
C  ØUTPUT INTERMEDIATE VALUES
      WDIS = -YWIDE/YFACT-WDIS
      IF(ISW(13)) 402,698,402
  402 WRITE(IIØUT,404)XWIDE,YWIDE,SL,SW,RX,RY,XFACT,YFACT
  404 FØRMAT('IV= ',2E12.5/2E12.5/2E12.5/2E12.5)
C  PLØT ØRIGIN IS AT 0,0 ØF STRUCTURE MØDEL
 698  CØNTINUE
C  INITIALIZATIØN IS CØMPLETE
C
      IF(ISW(1))115,115,405
C  READ CSS VALUES (FIRST DATA CARD USED IN PRØJ4)
  405 READ(IIN,699)JA,ANG,DMAXM,ILAT,RILTM,ILØNG,RILØM,JB
  699 FØRMAT(10A1,2F10.0,I4,F6.2,I4,F6.2,30A1)
      WRITE(IIØUT,699)JA,ANG,DMAXM,ILAT,RILTM,ILØNG,RILØM,JB
      RILT=DMTØR(ILAT,RILTM)
      RILG=DMTØR(ILØNG,RILØM)
      IF(ISW(1)-2)700,115,700
C
C  READING TALPLØT FØRMAT
C
C
  115 CØNTINUE
      READ(ITAPE,501)KSW
  501 FØRMAT(80I1)
      READ(ITAPE,120) RDENS,RWGT,RHØD,REFX,FXI,DELFX,M,IMAX
 120  FØRMAT(6F10.2,2I10)
      READ(ITAPE,135)(ØGA(I),I=1,M)
 135  FØRMAT(5F10.1)
      IF(KSW(2))553,553,552
  552 CØNTINUE
      READ(ITAPE,135) (FZ(I),I=1,M)
  553 CØNTINUE
C
C  NØW START READING PØLYGØNS
C
 145  READ(ITAPE,150) LNØ,RHØRK
 150  FØRMAT( I5,F10.3)
  160 I = 1
 162  CØNTINUE
     READ(ITAPE,168)XX,YY,ICØDE
  168 FØRMAT(2F10.2,I1)
C  MAKING DEPTHS NEGATIVE
      YY = -YY
C  CØNVERTING CØØRDINATES TØ INCHES
      XX = XX/XFACT
      YY = YY/YFACT
C  SHIFTING CØØRDINATES TØ CENTER ØF PLØT
      CXL(I) = XX-RX
      CYL(I) = -1.0*(RY-YY)
      CX = CXL(I)
      CY = CYL(I)
      IF(I-1)190,190,200
  190 CØNTINUE
      GØ TØ 250
  200 CXP = CXL(I-1)
```

```
            CALL INCEP(SL,SW,CX,CY,CXP,CYP,BX,BY,A1,A2,B1,B2)
            IF(ISW(13))406,205,406
       406  WRITE(IIOUT,408)SL,SW,CX,CY,CXP,CYP,BX,BY,A1,AI,B1,B2
       408  FORMAT(' IV* ',6E10.5/6E10.5)
       205  IF(A1-9990.0)210,248,248
      C  PLOT MODEL SEGMENT
       210  XX = A1+RX
            YY = B1+RY
            IPEN = 3
            CALL PLOT(XX,YY,IPEN)
            XX = A2+RX
            YY = B2+RY
            IPEN = 2
            CALL PLOT(XX,YY,IPEN)
       248  IF(ICODE-9)250,260,250
       250  I=I+1
            GO TO 162
       260  IF((JFMT.EQ.5) .OR. (JFMT.EQ.6)) GO TO 272
       262  NCDE = -1
      C   CHECKING IF POLYGON NUMBER = 1
            IF(LNO-1)1260,1190,1260
      C   CHECK IF PLOT 2-D BOUGUER ANOMALY
      1190  IF(ISW(8))1260,1260,1200
      1200  DO 1220 II=KFXN,M
            READ(ITAPE,1206)K,FX(K),SSELZ(K),BG2D(K)
      1206  FORMAT(I5,F10.2,10X,2F10.2)
      C  THIS SECTION PLOTS INTERMEDIATE DATA FOR EACH POLYGON
            IF(ISW(7))1210,1212,1210
      1210  XX=FX(K)/XFACT
            YY=SSELZ(K)/PFAC+PDIS
            YPO=YY+VIT
            IF(YPO.GE.29 .OR. YPO.LE.0) NCDE=-1; GO TO 1220
            CALL SYMBOL(XX,YY,HT,ICHAR,0.0,NCDE)
      1212  CONTINUE
            NCDE = -2
      1220  CONTINUE
            GO TO 271
      1260  IF(ISW(1).EQ.1) GO TO 271
            IF((JFMT.EQ.5) .OR. (JFMT.EQ.6)) GO TO 271
      C
      C          NEXT TWO IF STATEMENTS ASSUME PLOTTING OF MODEL POLYGONS
      C                   IS ONLY BEING DONE FROM TALPLOT OUTPUT ON MAG TAPE
      C
      C  ILOOP IS .EQ. 1 ONLY WHEN WE ARE PLOTTING THE MODIFIED POLYGON
            IF(ILOOP.EQ.1) GO TO 302
            IF(KSW(9).EQ.1) GO TO 271
            DO 270 III=KFXN,M
            READ(ITAPE,263)K,FX(K),SSELZ(K)
       263  FORMAT(I5,F10.2,10X,F10.2)
      C  THIS SECTION PLOTS INTERMEDIATE DATA FOR EACH
      C     POLYGON
            IF(ISW(7))554,555,554
       554  XX=FX(K)/XFACT
            YY=SSELZ(K)/PFAC+PDIS
            YPO=YY+VIT
            IF(YPO.GE.29 .OR. YPO.LE.0) NCDE=-1; GO TO 270
            CALL SYMBOL(XX,YY,HT,ICHAR,0.0,NCDE)
       555  CONTINUE
            NCDE = -2
       270  CONTINUE
```

```
  271   CØNTINUE
        ICHAR=ICHAR+1
  272   IF(LNØ-L) 145,290,145
   290  CØNTINUE
        IF(ISW(1))291,291,700
    291 IF(KSW(6).EQ.0) GØ TØ 300
        ILØØP=1
        GØ TØ 160
    300 IF((JFMT.EQ.5) .ØR. (JFMT.EQ.6)) GØ TØ 330
    302 DØ 310 K=KFXN,M
        READ(ITAPE,304)J,FX(K),SSELZ(K),DWGT(K)
    304 FØRMAT(I5,F10.2,20X,F10.2,36X,F16.0)
    310 CØNTINUE
C  NØW PLØT ELEV,ØGA,WEIGHT,SSELZ,AS REQUIRED BY SENSE
C       SWITCHES
        NCDE = -1
        IF(ISW(4))556,557,556
    556 DØ 590 K=KFXN,M
        XX=FX(K)/XFACT
        YY=FZ(K)*0.001/ELFAC+ELDIS
        YPØ=YY+VIT
        IF(YPØ.GE.29 .ØR. YPØ.LE.0) NCDE=-1; GØ TØ 590
       CALL SYMBØL(XX,YY,HT,0,0.0,NCDE)
        NCDE=-2
    590 CØNTINUE
    557 CØNTINUE
C  NØW PLØT ØBS. ERVEP + CALCULATED G
        IF(ISW(5))558,559,558
    558 NCDE = -1
        DØ 599 K=KFXN,M
       XX=FX(K)/XFACT
       YY=SSELZ(K)/GFAC+GDIS
        YPØ=YY+VIT
        IF(YPØ.GE.29 .ØR. YPØ.LE.0) NCDE=-1; GØ TØ 599
    591 CALL SYMBØL(XX,YY,HT,11,0.0,NCDE)
        NCDE=-2
  599   CØNTINUE
        NCDE = -1
        IPEN=3
        DØ 592 K=KFXN,M
        XX=FX(K)/XFACT
        YY=ØGA(K)/GFAC+GDIS
        YPØ=YY+VIT
        IF(YPØ.GE.29 .ØR. YPØ.LE.0) NCDE=-1; IPEN=3; GØ TØ 592
C       CALL SYMBØL(XX,YY,HT,0,0.0,NCDE)
        CALL PLØT(XX,YY,IPEN)
        NCDE=-2
        IPEN=2
  592   CØNTINUE
   559  CØNTINUE
C
C    CHECK IF PLØT 2-D BØUGUER ANØMALY
C       IF SØ, PLØT LINE WITHØUT SYMBØL
C
         IF(ISW(8)) 588,588,570
    570 IPEN=3
        DØ 585 K=KFXN,M
        XX=FX(K)/XFACT
         YY=BG2D(K)/GFAC + GDIS
```

```
      IF(YPO.GE.29. OR. YPO.LE.0) IPEN=3; GO TO 585
      CALL PLOT(XX,YY,IPEN)
      IPEN=2
  585 CONTINUE
  588 NCDE = -1
      IF(ISW(6))562,562,561
  561 DO 593 K=KFXN,M
     XX=FX(K)/XFACT
     YY=DWGT(K)/WFAC+WDIS
      YPO=YY+VIT
      IF(YPO.GE.29 .OR. YPO.LE.0) NCDE=-1; GO TO 593
      CALL SYMBOL(XX,YY,HT,1,0.0,NCDE)
      NCDE=-2
 593  CONTINUE
  562 CONTINUE
  330 WRITE(IIOUT,332)
  332 FORMAT('LAST POLYGON OF MODEL PLOTTED')
      IF(ISW(1))333,333,700
  333 CALL PLOT(XX,YY,999)
      CALL EXIT
  700 ITAPE = 105
C  SETTING UP CONSTANTS FOR PLOTTING SPFMT COLUMNS
C  BDIST = LENGTH OF TICK LINE IN INCHES
C  ANGB  = ANGLE IN DEGREES OF TICK LINE FROM HORIZONTAL
C                UPWARD ANGLE    = + ANGLE
C                DOWNWARD ANGLE  = - ANGLE
C  YFAC = KM PER INCH FOR PLOTTING COLUMN
C  SEP = SEPARATION DISTANCE IN INCHES BETWEEN COLUMNS
      DEGRA = 1.745329E-2
      RADEG = 57.29578
      RANGB= ANGB * DEGRA
      AC = COS(RANGB)
      AS = SIN(RANGB)
       AS=-1.0*AS
      KDA= 0
      KMO= 0
      KYR= 0
      BDIST=0.25
      ANGB=0.0
      YFAC=YFACT
      KGDA=0
      KGMO=0
      KGYR=0
      KGHM=0
      ZHT=1.0
      HGT=0.07
C
C  **********************
C   JFMT = 1 FOR GSUM FORMAT
C   JFMT = 2 FOR GSUM FORMAT
C   JFMT = 3 FOR SPFMT DATA
C   JFMT = 4 FOR SEISMICITY DATA
C   JFMT = 5 FOR MODEL POLYGONS
C   JFMT = 6 FOR TALPLOT INPUT
C   JFMT = 9 TO TERMINATE JOB
C  *********************
  701 READ (IIN,702)JFMT
  702 FORMAT(I1)
  703 OUTPUT JFMT
      GO TO (710,710,750,800,145,115,333,333,996)JFMT
```

```
C   PLOTTING GSUM DATA
 710  CONTINUE
      IPEN=3
 712  CONTINUE
      IF(ISW(30).EQ.0)ITAPE=1;GO TO 713
C
C  INITIALIZE GINOT IF THIS IS THE FIRST READ FOR GINOT
C
 713 IF(IGSUM.EQ.1)GO TO 714
      KK=0
      CALL        GINOT(ITAPE,JTAPE,KK,KGDA,KGMO,
     1   KGYR,KGHM,IDIF,ISORC,RLAT,RLONG,ELEV,K977,OBSG,
     2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
      IGSUM=1
 714 KK=1
      CALL        GINOT(ITAPE,JTAPE,KK,KGDA,KGMO,
     1   KGYR,KGHM,IDIF,ISORC,RLAT,RLONG,ELEV,K977,OBSG,
     2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
      IF(KK.EQ.8)GO TO 700
      IF(KK.EQ.9)GO TO 999
  63  KGDAO=KGDA
      KGMOO=KGMO
      KGYRO=KGYR
      KGHMO=KGHM
  73  DEPTH=IDEP
      IF(IDEP)78,74,78
  74  HEIGT=ELEV
      GO TO 64
  78  HEIGT = -DEPTH
  64  CONTINUE
C   CONVERTING HEIGT FROM METERS TO KM
      HEIGT=HEIGT*0.001
C  DETERMINE DISTANCE FROM ORIGIN
      GO TO 40
 720  YY=GDIS+(FA/GFAC)
      XX=DISTKM/XFACT
      YPO=YY+VIT
      IF(YPO.GE.29. OR. YPO.LE.0) IPEN=3;GO TO 723
      IF(ISW(14))721,721,722
C            PLOTTING A SMALL CIRCLE FOR FREE-AIR
 721  CALL PLOT(XX,YY,IPEN)
      IPEN=2
      GO TO 723
C            PLOTTING ONLY A DOT FOR FREE-AIR
 722  CALL PLOT(XX,YY,3)
      CALL PLOT(XX,YY,2)
      CALL PLOT(XX,YY,3)
      GO TO 723
C  CHECKING IF ALSO PLOT BOUGUER ANOMALY
 723  IF(ISW(2))728,728,725
C  PLOT BOUGUER ANOMALY
 725  XT=XX
      YT=GDIS+(BG/GFAC)
      YPO=YT+VIT
      IF(YPO.GE.29. OR. YPO.LE.0) GO TO 728
      CALL PLOT(XT,YT,3)
      CALL SPOT(XT,YT)
      CALL PLOT(XX,YY,3)
C  CHECKING IF ALSO PLOT HEIGHT
```

```
    730  XT=XX
         YT=HEIGT/ELFAC
         YPØ=YT+VIT
         IF(YPØ.GE.29. ØR. YPØ.LE.0) GØ TØ 712
         CALL PLØT(XT,YT,3)
         CALL SPØT(XT,YT)
         CALL PLØT(XX,YY,3)
         GØ TØ 712
C  PLØTTING SPFMT DATA
    750  IF(ISW(32).EQ.0) ITAPE =1
CC
C  READING U ØF TØRØNTØ WØRLD SEISMIC REFRACTIØN CØMPILATIØN
C
C  INITIALIZING PINØT, IF THIS IS FIRST READ
         IF (IPIN.EQ.1) GØ TØ 752
         KK = 0
        CALL        PINØT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,
      1   LØNG,LØM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,
      2   DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
         IPIN = 1
    752 KK=1
        CALL        PINØT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,
      1   LØNG,LØM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,
      2   DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
     18 IF(KK.EQ.8)GØ TØ 700
        IF(KK.EQ.9)GØ TØ 999
     20  CONTINUE
         VEL(1)=(FLØAT(J1))*0.1
         VEL(2)=(FLØAT(J2))*0.1
         VEL(3)=(FLØAT(J3))*0.1
         VEL(4)=(FLØAT(J4))*0.1
         VEL(5)=(FLØAT(J5))*0.1
         VEL(6)=(FLØAT(J6))*0.1
         VEL(7)=(FLØAT(J7))*0.1
         VEL(8)=(FLØAT(J8))*0.1
         THICK(1)=(FLØAT(K1))*0.1
         THICK(2)=(FLØAT(K2))*0.1
         THICK(3)=(FLØAT(K3))*0.1
         THICK(4)=(FLØAT(K4))*0.1
         THICK(5)=(FLØAT(K5))*0.1
         THICK(6)=(FLØAT(K6))*0.1
         THICK(7)=(FLØAT(K7))*0.1
         THICK(8)=(FLØAT(K8))*0.1
         VMANT=(FLØAT(IMANT))*0.1
         ELEV=NELEV
         ELEV=ELEV*0.01
     50  IF(N1-2) 70,60,70
C   SEA SEISMIC PRØFILE
     60  VELW= 1.5
         WATTK= ELEV
         GØ TØ 80
C   LAND SEISMIC PRØFILE
     70  VELW= 0.0
         WATTK= 0.0
C   MAIN PLØTTING LØØP
     80  RLATM = LATM
         RLØM  = LØM
         RLAT  =DMTØR(LAT,RLATM)
         RLØNG =DMTØR(LØNG,RLØM)
         IF(KNS-NNS)54, 52, 54
      52  RLAT = -RLAT
      54  IF(KEW-NEW)58,56,58
      56  RLONG = -RLONG
      58  CONTINUE
C  DETERMINE DISTANCE FROM ØRIGIN
          GØ TØ 40
     451  XX=DISTKM/XFACT
          YY = 0.0
          CALL PLØT(XX,YY,3)
          CALL       SPLØT(ISTA,RLAT,RLØNG,VEL,THICK,VELW,WATTK,VMANT,XX
       1    YFAC,ZHT,HGT,AC,AS,ANGB,BDIST)
          GØ TØ 750
C   PLØTTING SEISMICITY DATA
     80C  CONTINUE
        IF(ISW(36).EG.0)ITAPE=1
C
C     INITIALIZING YINØT, IF THIS IS FIRST READ
          IF(IYIN.EQ.1) GØ TØ 801
          KK =0
          CALL        YINØT(ITAPE,JTAPE,KK,
       1 ISR1,ISR2,KDA,KMØ,KYR,KHM,SEC,CLAT,KSN,DLØN,KWE,DEPT,AMAG,IMB,
       2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
       3 ICE,IMG,IAUTH,IGHY,NPP,IØQ,ILM,IS1,IS2)
C
          IYIN = 1
     801  KK = 1
          CALL        YINØT(ITAPE,JTAPE,KK,
       1 ISR1,ISR2,KDA,KMØ,KYR,KHM,SEC,DLAT,KSN,DLØN,KWE,DEPT,AMAG,IMB,
       2 ISØS,INTØ,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
       3 ICE,IMG,IAUTH,IGHY,NPP,IØQ,ILM,IS1,IS2)
          IF(KK.EQ.8) GØ TØ 700
          IF(KK.EQ.9) GØ TØ 999
C  DETERMINE DISTANCE FROM ØRIGIN
          KGDA=KCA
          KGMØ=KMØ
          KGYR=KYR
          KGHM=KHM
          KGDAØ=KGDA
          KGMØØ=KGMØ
          KGYRØ=KGYR
          KGHMØ=KGHM
          KL=0
          CALL DNAV(DLAT,KSN,DLØN,KWE,RLAT,RLØNG,KL)
          GØ TØ 40
     82C  XX=DISTKM/XFACT
          YY=-DEPT/YFACT
          YPØ=YY+VIT
          IF(YPØ.GE.29. ØR. YPØ.LE.0) GØ TØ 800
          CALL PLØT(XX,YY,3)
          CALL ANØV3(XX,YY,DEPT,AMAG)
          GØ TØ 800
      4C  CONTINUE
          CALL DISAZ(RLAT,RLØNG,RILT,RILG,1,A,B,DISTKM,C)
          IF(ANG)44,44,42
      42  IF(A-135)48,48,46
      44  IF(A-225)48,48,46
      46  DISTKM=-DISTKM
      48  CONTINUE
          IF(DISTKM.LT.BLEFT. ØR.DISTKM.GT.RIGT) IØØB = IØØB +1
          GØ TØ (720,720,451,820) JFMT
```

```
   49 OUTPUT 'OOB'
      GO TO (712,712,752,800)JFMT
  996 WRITE(IIOUT,997)
  997 FORMAT('JFMT = 9')
  998 FORMAT(1H0,'END OF PROCESSING',/,
     *    I5,'DATA POINTS OUT OF PLOT BOUNDS')
  999 WRITE(IIOUT,998) IOOB
       GO TO 333
      END
```

```
                  HEX     DEC                       HEX     DEC                       HEX     DEC
NAME   TYPE CLASS LOC     WORDS    NAME   TYPE CLASS LOC     WORDS    NAME   TYPE CLASS LOC     WORDS
----   ---- ----- ------- -----    ----   ---- ----- ------- -----    ----   ---- ----- ------- -----
A         R SCALR 00AF2 V     1    AC        R SCALR 00A8F V     1    AI        R SCALR 00A38 V     1
AMAG      R SCALR 00ADA V     1    ANG       R SCALR 00A6B V     1    ANGB      R SCALR 00A3A V     1
ANOV3       SPROG EXTERN           AS        R SCALR 00A39 V     1    AVWTN     R SCALR 00AC8 V     1
AVWTW     R SCALR 00ACB V     1    A1        R SCALR 00A84 V     1    A2        R SCALR 00A85 V     1
B         R SCALR 00AF3 V     1    BDIST     R SCALR 00A93 V     1    BG        R SCALR 00AA5 V     1
BG2D      R ARRAY 00912 V   200    BLEFT     R SCALR 00A50 V     1    BOT       R SCALR 00A4F V     1
BX        R SCALR 00A82 V     1    BY        R SCALR 00A83 V     1    B1        R SCALR 00A86 V     1
B2        R SCALR 00A87 V     1    C         R SCALR 00AF4 V     1    COS       R SPROG INTRIN
CRVN      R SCALR 00AC6 V     1    CRVW      R SCALR 00AC9 V     1    CX        R SCALR 00A7E V     1
CXL       R ARRAY 003FC V   100    CXP       R SCALR 00A80 V     1    CY        R SCALR 00A7F V     1
CYL       R ARRAY 00460 V   100    CYP       R SCALR 00A81 V     1    DBOT      R SCALR 00A5D V     1
DEGRA     R SCALR 00A32 V     1    DELFX     R SCALR 00A78 V     1    DEPT      R SCALR 00AD9 V     1
DEPTH     R SCALR 00A81 V     1    DINE      R SCALR 00AC4 V     1    DISAZ       SPROG EXTERN
DISTKM    R SCALR 00A3B V     1    DLAT      R SCALR 00AC5 V     1    DLON      R SCALR 00AD7 V     1
DMAXM     R SCALR 00A6C V     1    DMTOR     R SPROG EXTERN           DNAV        SPROG EXTERN
DWGT      R ARRAY 0071C V   200    ELDIS     R SCALR 00A55 V     1    ELEV      R SCALR 00AA0 V     1
ELFAC     R SCALR 00A54 V     1    EXIT        SPROG EXTERN           FA        R SCALR 00AA4 V     1
FLOAT     R SPROG INTRIN           FX        R ARRAY 0058C V   200    FXI       R SCALR 00A77 V     1
FZ        R ARRAY 00834 V   200    GDIS      R SCALR 00A57 V     1    GFAC      R SCALR 00A56 V     1
GINOT       SPROG EXTERN           HEIGT     R SCALR 00AB2 V     1    HGT       R SCALR 00A9A V     1
HT        R SCALR 00ABC V     1    I         I SCALR 00A28 V     1    IA        I ARRAY 00A02 V    35
IASP      I SCALR 00AE6 V     1    IAUTH     I SCALR 00AEA V     1    IBUF      I ARRAY 00000 V  1000
ICE       I SCALR 00AE8 V     1    ICHAR     I SCALR 00AB2 V     1    ICHG      I SPROG EXTERN
ICODE     I SCALR 00A7D V     1    IDEP      I SCALR 00AA3 V     1    IDESC     I ARRAY 008FC V     6
IDIAB     I SCALR 00ADE V     1    IDIF      I SCALR 00A9C V     1    IELC      I SCALR 00AA7 V     1
IFBC      I SCALR 00AAC V     1    IFEG      I SCALR 00AE4 V     1    IFFC      I SCALR 00AAB V     1
IGC       I SCALR 00AA8 V     1    IGSUM     I SCALR 00A2E V     1    II        I SCALR 00A29 V     1
III       I SCALR 00A8C V     1    IIN       I SCALR 00A2A V     1    IIOUT     I SCALR 00A2B V     1
ILAT      I SCALR 00A6D V     1    ILM       I SCALR 00AEE V     1    ILONG     I SCALR 00A6F V     1
ILOOP     I SCALR 00A31 V     1    IMANT     I SCALR 00ABC V     1    IMAX      I SCALR 00A7A V     1
IMB       I SCALR 00ADB V     1    IMG       I SCALR 00AE9 V     1    IMS       I SCALR 00AE5 V     1
INCEP       SPROG EXTERN           INONT     I SCALR 00AE2 V     1    INPT      I SCALR 00A64 V     1
INTS      I SCALR 00ADD V     1    IOOB      I SCALR 00A34 V     1    IOQ       I SCALR 00AED V     1
IPEN      I SCALR 00A88 V     1    IPIN      I SCALR 00A37 V     1    IQHY      I SCALR 00AEB V     1
IREGC     I SCALR 00AAA V     1    ISEICH    I SCALR 00AE0 V     1    ISORC     I SCALR 00A9D V     1
ISOS      I SCALR 00ADC V     1    ISR1      I SCALR 00AD1 V     1    ISR2      I SCALR 00AD2 V     1
ISTA      I SCALR 00AB4 V     1    ISTRT     I SCALR 00A53 V     1    ISW       I SPROG EXTERN
IS1       I SCALR 00AEF V     1    IS2       I SCALR 00AF0 V     1    ITAPE     I SCALR 00A2C V     1
ITSU      I SCALR 00ADF V     1    IVOLC     I SCALR 00AE1 V     1    IWG       I SCALR 00AE3 V     1
IYIN      I SCALR 00A36 V     1    IYR       I SCALR 00AC3 V     1    IZH       I SCALR 00AE7 V     1
J         I SCALR 00A8D V     1    JA        I ARRAY 009DA V    10    JB        I ARRAY 009E4 V    30
JFMT      I SCALR 00A35 V     1    JTAPE     I SCALR 00A2D V     1    J1        I SCALR 00A3C V     1
J2        I SCALR 00A3D V     1    J3        I SCALR 00A3E V     1    J4        I SCALR 00A3F V     1
J5        I SCALR 00A40 V     1    J6        I SCALR 00A41 V     1    J7        I SCALR 00A42 V     1
J8        I SCALR 00A43 V     1    K         I SCALR 00A8A V     1    KDA       I SCALR 00A90 V     1
KEW       I SCALR 00AEB V     1    KEY       I SCALR 00AB5 V     1    KFXN      I SCALR 00A30 V     1
KGDA      I SCALR 00A95 V     1    KGDAO     I SCALR 00AAD V     1    KGHM      I SCALR 00A98 V     1
KGHMO     I SCALR 00AB0 V     1    KGMO      I SCALR 00A96 V     1    KGMOO     I SCALR 00AAE V     1
KGYR      I SCALR 00A97 V     1    KGYRO     I SCALR 00AAF V     1    KHM       I SCALR 00AD3 V     1
KK        I SCALR 00A9B V     1    KL        I SCALR 00AF1 V     1    KMO       I SCALR 00A91 V     1
KNS       I SCALR 00A88 V     1    KSN       I SCALR 00AD6 V     1    KSW       I ARRAY 007E4 V    80
KWE       I SCALR 00AD8 V     1    KYR       I SCALR 00A92 V     1    K1        I SCALR 00A44 V     1
K2        I SCALR 00A45 V     1    K3        I SCALR 00A46 V     1    K4        I SCALR 00A47 V     1
K5        I SCALR 00A48 V     1    K6        I SCALR 00A49 V     1    K7        I SCALR 00A4A V     1
K8        I SCALR 00A4B V     1    K977      I SCALR 00AA1 V     1    L         I SCALR 00A2F V     1
LABEL     I ARRAY 003E8 V    20    LAT       I SCALR 00AB6 V     1    LATM      I SCALR 00AB7 V     1
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LNO      I SCALR  00A78 V      1    LOM      I SCALR  00ABA V      1    LONG     I SCALR  00AB9 V      1
M        I SCALR  00A79 V      1    MET      I SCALR  00AC2 V      1    NCDE     I SCALR  00A89 V      1
NELEV    I SCALR  00ABD V      1    NEW      I SCALR  00A26 V      1    NNS      I SCALR  00A25 V      1
NPP      I SCALR  00AEC V      1    N1       I SCALR  00ABE V      1    N2       I SCALR  00ABF V      1
N3       I SCALR  00AC0 V      1    N4       I SCALR  00AC1 V      1    OBSG     R SCALR  00AA2 V      1
OGA      R ARRAY  004C4 V    200    PDIS     R SCALR  00A5B V      1    PFAC     R SCALR  00A5A V      1
PINOT      SPROG  EXTERN            PLOT       SPROG  EXTERN            PLOTS      SPROG  EXTERN
RADEG    R SCALR  00A33 V      1    RANGB    R SCALR  00A8E V      1    RDENS    R SCALR  00A73 V      1
REFX     R SCALR  00A76 V      1    RFA      R SCALR  00AA9 V      1    RFACT    R SCALR  00A27 V      1
RHOC     R SCALR  00A75 V      1    RHORK    R SCALR  00A7C V      1    RIGT     R SCALR  00A51 V      1
RILG     R SCALR  00A72 V      1    RILOM    R SCALR  00A70 V      1    RILT     R SCALR  00A71 V      1
RILTM    R SCALR  00A6E V      1    RLAT     R SCALR  00A9E V      1    RLATM    R SCALR  00ACF V      1
RLOM     R SCALR  00AD0 V      1    RLONG    R SCALR  00A9F V      1    RWGT     R SCALR  00A74 V      1
RX       R SCALR  00A69 V      1    RY       R SCALR  00A6A V      1    SEC      R SCALR  00AD4 V      1
SIN      R SPROG  INTRIN            SL       R SCALR  00A60 V      1    SPLOT      SPROG  EXTERN
SPOT       SPROG  EXTERN            SSELZ    R ARRAY  00654 V    200    STAT       SPROG  EXTERN
STHIK    R SCALR  00AC5 V      1    SW       R SCALR  00A61 V      1    SYMBOL     SPROG  EXTERN
TC       R SCALR  00AA6 V      1    THICK    R ARRAY  0090A V      8    TOP      R SCALR  00A4E V      1
VEL      R ARRAY  00902 V      8    VELW     R SCALR  00ACD V      1    VIT      R SCALR  00A65 V      1
VMANT    R SCALR  00ACC V      1    WATTK    R SCALR  00ACE V      1    WDIS     R SCALR  00A59 V      1
WFAC     R SCALR  00A58 V      1    WGTN     R SCALR  00AC7 V      1    WGTW     R SCALR  00ACA V      1
WHERE      SPROG  EXTERN            XFACT    R SCALR  00A4C V      1    XORG     R SCALR  00A62 V      1
XT       R SCALR  00A66 V      1    XWIDE    R SCALR  00A5E V      1    XX       R SCALR  00A67 V      1
YFAC     R SCALR  00A94 V      1    YFACT    R SCALR  00A4D V      1    YINOT      SPROG  EXTERN
YORG     R SCALR  00A63 V      1    YPO      R SCALR  00A8B V      1    YT       R SCALR  00AB3 V      1
YWIDE    R SCALR  00A5F V      1    YY       R SCALR  00A68 V      1    ZHT      R SCALR  00A99 V      1


         HEX             HEX             HEX             HEX             HEX             HEX
LABEL    LOC    LABEL    LOC    LABEL    LOC    LABEL    LOC    LABEL    LOC    LABEL    LOC
-----   -----   -----   -----   -----   -----   -----   -----   -----   -----   -----   -----
    1   0001F      11   00090      18   005DF      20   005E5      40   00713      42   00720
   44   00724      46   00727      48   0072A      49   0073A      50   0062F      52   0064E
   54   00651      56   00654      58   00657      60   00632      63   00507      64   0051A
   70   00637      73   0050F      74   00514      78   00517      80   00638     100   0004A
  101   00059     102   00064     115   001F8     120   0020D     135   00220     145   00233
  150   00239     160   0023D     162   0023F     168   00246     190   00266     200   00267
  205   00297     210   0029A     248   002B4     250   002B7     260   002B9     262   002BF
  263   00327     270   00350     271   00355     272   00356     290   00359     291   0035E
  300   00363     302   00369     304   00379     310   00382     330   00455     332   00459
  333   00468     402   001A4     404   001B0     405   001BF     406   00280     408   00290
  451   00658     501   001FE     552   00225     553   00233     554   00332     555   0034E
  556   0038E     557   00382     558   003B7     559   00404     561   00432     562   00455
  570   00409     585   00426     588   0042B     590   003AD     591   003CD     592   003FF
  593   0045C     599   003D7     698   001BA     699   001CF     700   0046F     701   0049A
  702   0049F     703   004A1     710   004B8     712   0048A     713   004C2     714   004E4
  720   0051E     721   00535     722   0053D     723   0054D     725   00552     728   0056E
  730   00573     750   0058F     752   005ED     800   00676     801   006AC     820   006F8
  996   00749     997   0074D     998   00751     999   00762    1190   002C4    1200   002C9
 1206   00209    1210   002E5    1212   00301    1220   00303    1260   00309    5018   0012D
 5019   00130    5021   00132    5022   00138    5023   00141    5024   0016E    5025   00171
 5026   00176

LOCAL VARIABLES (28C5 WORDS):

   00000 IBUF        003E8 LABEL       003FC CXL         0046C CYL         004C4 OGA         0058C FX
   00654 SSELZ       0071C DWGT        007E4 KSW         00834 FZ          008FC IDESC       00902 VEL
   0090A THICK       00912 OG2D        009CA JA          009E4 JB          00A02 IA          00A25 NNS
   00A26 NEW         00A27 RFACT       00A28 I           00A29 II          00A2A IIN         00A2B IIOUT
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00A2C ITAPE     00A2D JTAPE     00A2E IGSUM     00A2F L         00A30 KFXN      00A31 ILOOP
00A32 DEGRA     00A33 RADEG     00A34 IOOB      00A35 JFMT      00A36 IYIN      00A37 IPIN
00A38 AI        00A39 AS        00A3A ANGB      00A3B DISTKM    00A3C J1        00A3D J2
00A3E J3        00A3F J4        00A40 J5        00A41 J6        00A42 J7        00A43 J8
00A44 K1        00A45 K2        00A46 K3        00A47 K4        00A48 K5        00A49 K6
00A4A K7        00A4B K8        00A4C XFACT     00A4D YFACT     00A4E TOP       00A4F BOT
00A50 BLEFT     00A51 RIGT      00A52 ICHAR     00A53 ISTRT     00A54 ELFAC     00A55 ELDIS
00A56 GFAC      00A57 GDIS      00A58 WFAC      00A59 WDIS      00A5A PFAC      00A5B PDIS
00A5C HT        00A5D DBOT      00A5E XWIDE     00A5F YWIDE     00A60 SL        00A61 SW
00A62 XORG      00A63 YORG      00A64 INPT      00A65 VIT       00A66 XT        00A67 XX
00A68 YY        00A69 RX        00A6A RY        00A6B ANG       00A6C DMAXM     00A6D ILAT
00A6E RILTM     00A6F ILONG     00A70 RILOM     00A71 RILT      00A72 RILG      00A73 RDENS
00A74 RNGT      00A75 RHOD      00A76 REFX      00A77 FXI       00A78 DELFX     00A79 M
00A7A IMAX      00A7B LNO       00A7C RHORK     00A7D ICODE     00A7E CX        00A7F CY
00A80 CXP       00A81 CYP       00A82 BX        00A83 BY        00A84 A1        00A85 A2
00A86 B1        00A87 B2        00A88 IPEN      00A89 NCDE      00A8A K         00A8B YPO
00A8C III       00A8D J         00A8E RANGB     00A8F AC        00A90 KDA       00A91 KMO
00A92 KYR       00A93 ODIST     00A94 YFAC      00A95 KGDA      00A96 KGMO      00A97 KGYR
00A98 KGHM      00A99 ZHT       00A9A HGT       00A9B KK        00A9C IDIF      00A9D ISORC
00A9E RLAT      00A9F RLONG     00AA0 ELEV      00AA1 K977      00AA2 OBSG      00AA3 IDEP
00AA4 FA        00AA5 BG        00AA6 TC        00AA7 IELC      00AA8 IGC       00AA9 RFA
00AAA IREGC     00AAB IFFC      00AAC IFBC      00AAD KGDAO     00AAE KGMOO     00AAF KGYRO
00AB0 KGHMO     00AB1 DEPTH     00AB2 HEIGT     00AB3 YT        00AB4 ISTA      00AB5 KEY
00AB6 LAT       00AB7 LATM      00AB8 KNS       00AB9 LONG      00ABA LOM       00ABB KEW
00ABC IMANT     00ABD NELEV     00ABE N1        00ABF N2        00AC0 N3        00AC1 N4
00AC2 MET       00AC3 IYR       00AC4 DINE      00AC5 STHIK     00AC6 CRVN      00AC7 WGTN
00AC8 AVWTN     00AC9 CRVW      00ACA WGTW      00ACB AVWTW     00ACC VMANT     00ACD VELW
00ACE WATTK     00ACF RLATM     00AD0 RLOM      00AD1 ISR1      00AD2 ISR2      00AD3 KHM
00AD4 SEC       00AD5 DLAT      00AD6 KSN       00AD7 DLON      00AD8 KWE       00AD9 DEPT
00ADA AMAG      00ADB IMB       00ADC ISOS      00ADD INTS      00ADE IDIAS     00ADF ITSU
00AE0 ISEICH    00AE1 IVOLC     00AE2 INONT     00AE3 IWG       00AE4 IFEG      00AE5 IMS
00AE6 IASP      00AE7 IZH       00AE8 ICE       00AE9 IMG       00AEA IAUTH     00AEB IQHY
00AEC NPP       00AED IOG       00AEE ILM       00AEF IS1       00AF0 IS2       00AF1 KL
00AF2 A         00AF3 B         00AF4 C

BLANK COMMON (0 WORDS)

INTRINSIC SUBPROGRAMS USED:

   COS       FLOAT       SIN

EXTERNAL SUBPROGRAMS REQUIRED:

   ANOV3     DISAZ     DMTOR     DNAV       EXIT       GINOT     ICHG      INCEP
   ISW       PINOT     PLOT      PLOTS      SPLOT      SPOT      STAT      SYMBOL
   WHERE     YINOT     F:101     F:102      F:103      F:104     F:105     F:106
   F:108     MIDO      MIOC      9BCDREAD   9BCDWRIT   9COS      9ENDIOL   9INITIAL
   9IODATA   9IOLUSA   9ITOR     9PRINT     9SIN       9STOP
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```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC        HEX
                     WØRDS      WØRDS
                     =====      =====
  GENERATED CØDE:    1896       00768
        CØNSTANTS:     42       0002A
 LØCAL VARIABLES:    2805       00AF5
            TEMPS:      1       00001
                     =====      =====
   TØTAL PRØGRAM:    4744       01288
```

C [illegible] 7 MAR

[illegible]

```
C     PRØGRAM NØAA
C     VERSØØN ØF 8 JUN 74 TØ DØ LAMØNT
C     VERSIØN ØF 10 JAN 1974 TØ REMØVE ABØRT FØR BUFF IN ERRØR
C     FØR INITIAL CØNVERSIØN ØF C.AIG AND USGS 1971 IDØE
C     INITIAL VERSIØN 10 DECEMBER 1973
C     HESKANIAN G METER
C
      DIMENSIØN IBUFIN(20,50,2), IBUFØT(32,50,2)
      DIMENSIØN IA(35),CRUISE(8)
      DIMENSIØN IZ(9),IW(35)
      ITAPE=1
      JTAPE=2
      IIN=105
      IØUT=108
      IREC1=1
      KK=0
      KI=1
      KØ=-2
      IFLIP=1
      JFLIP=1
      KFLIP=1
      NFLIP=1
      ICNT=0
      NREC=0
      ELEV=0.
      IØUTSW=0
      NIN=50
      NØUT=0
      READ(IIN,1005) ISØRC
      WRITE(IØUT,1002)ISØRC
      IFFC=16
      ~~IGC=0~~          IGC = ϕ
      DEGRA=1.745329E-2
      RADEG=57.29578
      IENDKEY=0
      IELC=5
      IREGC=0
      IFBC=0
C     DENS=2.67-1.03
      DENS=1.64                                  7 MAR 75
      ØUTPUT ' PRØGRAM NØAA VERS ØF ~~8 JUN 74'~~
C
C     BUFFER LØGIC FØR I/P
C
      CALL BUFF IN(ITAPE,0,IBUFIN(1,1,IFLIP),1000)
   10 CØNTINUE
      IF (NIN.LT.50) GØ TØ 90
   15 CØNTINUE
      CALL ICHECK(ITAPE,IKEY,NI)
      GØ TØ (20,50,30,40) IKEY
   20 ØUTPUT 'WAITING FØR I/P'; IEØD=0
      GØ TØ 15
   30 ØUTPUT 'END ØF FILE ØN ITAPE';IEØD=1
      GØ TØ 50
   40 ØUTPUT 'BUFF IN ERRØR'
   50 CØNTINUE
      NIN=0
      NFLIP=IFLIP
      IFLIP=3-IFLIP
      IF(IEØD.NE.1) CALL BUFF IN(ITAPE,0,IBUFIN(1,1,IFLIP),1000)
C
C     INPUT LØGIC
C
   90 CØNTINUE
      NIN=NIN+1
      IF (IEØD.NE.1) GØ TØ 95
C     GØING TØ EØF PRØCESSING
      IF(IENDKEY.EQ.1) GØ TØ 999
      NINCHK=NIN*20
      IF(NINCHK.GE.NI) IENDKEY=1
   95 CØNTINUE
      DECØDE(80,1003,IBUFIN(1,NIN,NFLIP),ND)
     1                   (CRUISE(I),I=1,8),ITIMEZ,IYR,IMØ,IDA,IHR,IMIN,
     2    DLAT,DLØNG,NAVPT,NAVTYP,ICURAZ,CURVEL,IUNCFATH,ICØRRM,
     3    IMATHZØ,IMAG,IRESMAG,IFA
C
C     EDIT LØGIC
C
      IF(NAVPT.NE.0) GØ TØ 10
      IF (IFA.EQ.0) GØ TØ 10
      IF(ITIMEZ.NE.0) CALL CHGMT(IDA,IMØ,IYR,KHM,KTZ,KGDA,KGMØ,KGYR,
     1                KGHM,NTZ) ; KTZ=9 ; GØ TØ 100
      KGDA=IDA
      KGMØ=IMØ
      KGYR=IYR
  100 CØNTINUE
      ICURVEL=IDINT(CURVEL*10.)
      RLAT=DLAT*DEGRA
      RLØNG=DLØNG*DEGRA
      THEØ=GINTF(RLAT)
      DFA=FLØAT(IFA)*.1
      FA=DFA
      GØBS=THEØ+DFA
      CALL ØBG(K977,ØBSG,GØBS,KØ)
      IDEP=ICØRRM
      DMIN=FLØAT(IMIN)
      DMINT=DMIN*.1
      JMIN=IDINT(DMINT)
      DJMIN=FLØAT(JMIN)
      MINT=IDINT(DMINT-DJMIN)
      KHM=JMIN+IHR*100
      KGHM=KHM
      DTZ=FLØAT(ITIMEZ)
      KTZ=IDINT(DTZ*.1)
      DEP=FLØAT(IDEP)
      ØG=FA+(0.04185*DENS*DEP)
      IF(IDEP.EQ.0)  ØG=999.0
      PLAT=DLAT+90.;LTKEY=PLAT
      PLØNG=DLØNG+180.;LGKEY=PLØNG
      IAKEY=0
      ENCØDE(35,1004,IZ)(CRUISE(I),I=1,8),KTZ,MINT,NAVPT,ICURAZ,
     1ICURVEL,IUNCFATH,IMATHZØ,IMAG, IRESMAG
      CALL UNPKBY(IZ,IW,35)
      DØ 120 I=1,35
      IA(I)=ISL(IW(I),24)
  120 CØNTINUE
C
C     ØUTPUT LØGIC
C
```

```
  300 CONTINUE
      NOUT=NOUT+1
       ENCODE(128,1001,IBUFOT(1,NOUT,JFLIP),ND)IREC1,ISORC,KGFA,K
     1    KGYR,KGHM,DLAT,DLONG,ELEV,K977,OBSG,IDEP,FA,BG,TC,IELC,IGC,
     2   RFA,IREGC,IFFC,IA,IFOC,LTKEY,LGKEY,IAKEY
  305 CONTINUE
      NREC=NREC+1
      IF(NOUT.LT.50) GO TO 10
C
C      BUFFER LOGIC FOR O/P
C
  310 CONTINUE
      IF(IOUTSW.NE.1) IOUTSW=1;GO TO 350
      JKEY=ICHECK(JTAPE)
      GO TO (320,350,330,340) JKEY
  320 OUTPUT 'WAITING FOR O/P' ; IEOD=0
      GO TO 310
  330 OUTPUT'END OF FILE JTAPE'  ;IEOD=1
      GO TO 999
  340 OUTPUT 'BUFF OUT ERROR' ; IEOD=1
      GO TO 999
  350 CONTINUE
      NOUT=0
      KFLIP=JFLIP
      JFLIP=3-JFLIP
      CALL  BUFF OUT(JTAPE,0,IBUFOT(1,1,KFLIP),1600)
      GO TO 10
C
C     END OF JOB
C
  999 CONTINUE
  910 CONTINUE
      JKEY=ICHECK(JTAPE)
      GO TO (920,950,930,940) JKEY
  920 OUTPUT 'WAITING FOR O/P' ; IEOD=0
      GO TO 910
  930 OUTPUT 'BAD JKEY' ; IEOD=1
      GO TO 960
  940 OUTPUT 'BUFF OUT ERROR' ; IEOD=1
      GO TO 960
  950 CONTINUE
      JWDS=NOUT*50
      CALL BUFF OUT(JTAPE,0,IBUFOT(1,1,JFLIP),JWDS)
  960 CONTINUE
      END FILE JTAPE
      OUTPUT NREC
      OUTPUT 'ALL DONE'
C
C     FORMATS
C
 1001 FORMAT(I1,I4,3I2,I4,2F9.4,F7.2,I3,F6.2,I5,2F6.1,F4.1,
     1       2I2,F6.1,I1,I2,35A1,1X,I1,2I3,I2)
 1002 FORMAT(1X,'THIS RUN PROCESSED SOURCE CODE',I5)
 1003 FORMAT(8A1,I5,3I2,1X,I2,I3,F8.4,F9.4,2I1,I3,F4.1,1X,2I5,I2,1X,3I5)
 1004 FORMAT(8A1,3I1,2I3,I5,I2,2I5)
 1005 FORMAT(I5)
      END
```

```
                              HEX     DEC                                     HEX     DEC                                     HEX     DEC
NAME      TYPE CLASS          LØC     WØRDS   NAME      TYPE CLASS          LØC     WØRDS   NAME      TYPE CLASS          LØC     WØRDS
----      ---- -----        -------   -----   ----      ---- -----        -------   -----   ----      ---- -----        -------   -----
ØG           R SCALR        014F3 V       1   BUFFIN         SPRØG        EXTERN            BUFFØUT        SPRØG        EXTERN
CHGMT          SPRØG        EXTERN            CRUISE       R ARRAY        01473 V       8   CURVEL       R SCALR        014D4 V       1
DEGRA        R SCALR        014BC V       1   DENS         R SCALR        014C2 V       1   DEP          R SCALR        014F2 V       1
DFA          R SCALR        014E6 V       1   DJMIN        R SCALR        014EF V       1   DLAT         R SCALR        014CF V       1
CLØNG        R SCALR        014D0 V       1   DMIN         R SCALR        014EC V       1   DMINT        R SCALR        014ED V       1
DTZ          R SCALR        014F1 V       1   ELEV         R SCALR        014B5 V       1   FA           R SCALR        014E7 V       1
FLØAT        R SPRØG        INTRIN            GINTF        R SPRØG        EXTERN            GØBS         R SCALR        014E8 V       1
I            I SCALR        014C8 V       1   IA           I ARRAY        01450 V      35   IAKEY        I SCALR        014F8 V       1
IBUFIN       I ARRAY        00000 V    2000   IBUFØT       I ARRAY        007D0 V    3200   ICHECK       I SPRØG        EXTERN
ICNT         I SCALR        014B3 V       1   ICØRRM       I SCALR        014D6 V       1   ICURAZ       I SCALR        014D3 V       1
ICURVEL      I SCALR        014E2 V       1   IDA          I SCALR        014CC V       1   IDEP         I SCALR        014EB V       1
IDINT        I SPRØG        INTRIN            IELC         I SCALR        014BF V       1   IENDKEY      I SCALR        014BE V       1
IEØD         I SCALR        014C5 V       1   IFA          I SCALR        014DA V       1   IFBC         I SCALR        014C1 V       1
IFFC         I SCALR        014BA V       1   IFLIP        I SCALR        014AF V       1   IGC          I SCALR        014BB V       1
IHR          I SCALR        014CD V       1   IIN          I SCALR        014A9 V       1   IKEY         I SCALR        014C3 V       1
IMAG         I SCALR        014D8 V       1   IMATHZØ      I SCALR        014D7 V       1   IMIN         I SCALR        014CE V       1
IMØ          I SCALR        014CB V       1   IØUT         I SCALR        014AA V       1   IØUTSW       I SCALR        014B6 V       1
IREC1        I SCALR        014AB V       1   IREGC        I SCALR        014C0 V       1   IRESMAG      I SCALR        014D9 V       1
ISL          I SPRØG        INTRIN            ISØRC        I SCALR        014B9 V       1   ITAPE        I SCALR        014A7 V       1
ITIMEZ       I SCALR        014C9 V       1   IUNCFATH     I SCALR        014D5 V       1   IW           I ARRAY        01484 V      35
IYR          I SCALR        014CA V       1   IZ           I ARRAY        0147B V       9   JFLIP        I SCALR        014B0 V       1
JKEY         I SCALR        014FB V       1   JMIN         I SCALR        014EE V       1   JTAPE        I SCALR        014A8 V       1
JWØS         I SCALR        014FC V       1   KFLIP        I SCALR        014B1 V       1   KGDA         I SCALR        014DD V       1
KGHM         I SCALR        014E0 V       1   KGMØ         I SCALR        014DE V       1   KGYR         I SCALR        014DF V       1
KHM          I SCALR        014DB V       1   KI           I SCALR        014AD V       1   KK           I SCALR        014AC V       1
KØ           I SCALR        014AE V       1   KTZ          I SCALR        014DC V       1   K977         I SCALR        014E9 V       1
LGKEY        I SCALR        014F7 V       1   LTKEY        I SCALR        014F5 V       1   MINT         I SCALR        014F0 V       1
NAVPT        I SCALR        014D1 V       1   NAVTYP       I SCALR        014D2 V       1   ND           I SCALR        014C7 V       1
NFLIP        I SCALR        014B2 V       1   NI           I SCALR        014C4 V       1   NIN          I SCALR        014B7 V       1
NINCHK       I SCALR        014C6 V       1   NØUT         I SCALR        014B8 V       1   NREC         I SCALR        014B4 V       1
NTZ          I SCALR        014E1 V       1   ØBG            SPRØG        EXTERN            ØBSG         R SCALR        014EA V       1
PLAT         R SCALR        014F4 V       1   PLØNG        R SCALR        014F6 V       1   RADEG        R SCALR        014BD V       1
RFA          R SCALR        014FA V       1   RLAT         R SCALR        014E3 V       1   RLØNG        R SCALR        014E4 V       1
TC           R SCALR        014F9 V       1   THEØ         R SCALR        014E5 V       1   UNPKBY         SPRØG        EXTERN

        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC
-----   -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
   10   00058         15   0005B         20   00069         30   00075         40   00083         50   0008C
   90   000A0         95   000AF        100   000EF        120   00167        300   00169        305   00190
  310   00194        320   001A7        330   001B3        340   001C0        350   001CC        910   001DE
  920   001EB        930   001F7        940   00202        950   0020E        960   0021B        999   001DE
 1001   0022E       1002   00243       1003   0024E       1004   0025E       1005   00265

LØCAL VARIABLES (5373 WØRDS):

   00000 IBUFIN       007D0 IBUFØT       01450 IA           01473 CRUISE       0147B IZ           01484 IW
   014A7 ITAPE        014A8 JTAPE        014A9 IIN          014AA IØUT         014AB IREC1        014AC KK
   014AD KI           014AE KØ           014AF IFLIP        014B0 JFLIP        014B1 KFLIP        014B2 NFLIP
   014B3 ICNT         014B4 NREC         014B5 ELEV         014B6 IØUTSW       014B7 NIN          014B8 NØUT
   014B9 ISØRC        014BA IFFC         014BB IGC          014BC DEGRA        014BD RADEG        014BE IENDKEY
   014BF IELC         014C0 IREGC        014C1 IFBC         014C2 DENS         014C3 IKEY         014C4 NI
   014C5 IEØD         014C6 NINCHK       014C7 ND           014C8 I            014C9 ITIMEZ       014CA IYR
   014CB IMØ          014CC IDA          014CD IHR          014CE IMIN         014CF DLAT         014D0 CLØNG
   014D1 NAVPT      014D2 NAVTYP     014D3 ICURAZ     014D4 CURVEL     014D5 IUNCFATH   014D6 ICØRRM
   014D7 IMATHZØ    014D8 IMAG       014D9 IRESMAG    014DA IFA        014DB KHM        014DC KTZ
   014DD KGDA       014DE KGMØ       014DF KGYR       014E0 KGHM       014E1 NTZ        014E2 ICURVEL
   014E3 RLAT       014E4 RLØNG      014E5 THEØ       014E6 DFA        014E7 FA         014E8 GØBS
   014E9 K977       014EA ØBSG       014EB IDEP       014EC DMIN       014ED DMINT      014EE JMIN
   014EF DJMIN      014F0 MINT       014F1 DTZ        014F2 DEP        014F3 BG         014F4 PLAT
   014F5 LTKEY      014F6 PLØNG      014F7 LGKEY      014F8 IAKEY      014F9 TC         014FA RFA
   014FB JKEY       014FC JWDS

BLANK CØMMØN (0 WØRDS)

INTRINSIC SUBPRØGRAMS USED:

   FLØAT      IDINT      ISL

EXTERNAL SUBPRØGRAMS REQUIRED:

   BUFFIN     BUFFØUT    CHGMT      GINTF      ICHECK     ØBG        UNPKBY     F:101
   F:102      F:103      F:104      F:105      F:106      F:108      M:DØ       M:ØC
   9BCDREAD   9BCDWRIT   9DECØDE    9ENCØDE    9ENDFILE   9ENDIØL    9INITIAL   9IØDATA
   9IØLUSA    9ITØR      9PRINT     9RTØI      9STØP

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC     HEX
                   WØRDS   WØRDS
                   -----   -----
  GENERATED CØDE:    617   00269
       CØNSTANTS:     13   0000D
 LØCAL VARIABLES:   5373   014FD
           TEMPS:      1   00001
                   -----   -----
   TØTAL PRØGRAM:   6004 . 01774
```

```
C       PRØGRAM PRØFG
C
        DIMENSIØN PLT(15)
       DIMENSIØN IA(35)
C
C       VERSIØN ØF 2 ØCT 75 TØ CALL GINØT
C  PRØGRAM PRØFG,  PLØTS PRØFILE ØF SELECTED VARIABLE
C                       READ FRØM GSUM FØRMAT
C
C
C  X AXIS PRØPØRTIØNAL TØ EITHER DISTANCE ØR TIME ALØNG TRACK
C
C          IF LCNT=9000 ØR GREATER THEN TIME ANØTATIØN
C              IS DELETED
C
C  HAS DATA AND DISTANCE LIMITS AS INPUT
C
C      FØR SELECTIØN ØF SINGLE STATIØN SSW(5) = 1 AND MSTA READ IN
C        AS THE STAIØN NUMBER TØ BE SELECTED
C      USES GINØT, FIND, ISW, STAT, EVIL, CDATE, MCVØL, SPØT,
C
C      SSW(5)=1 TØ SELECT SINGLE STAIØN NUMBER
C       SSW (14) = UP TØ CALL FIND
C
C
        DIMENSIØN IBUF(1000)
C
C
        IIN = 105
        IIØUT = 108
       KK=0
       JTAPE=2
       KI=1
       INNT=ISW(-2)
       CALL GINØT(ITAPE,JTAPE,KK)
        CALL PLØTS (IBUF, -1000)
        WRITE (IIØUT,600)
  600 FØRMAT(/,'PRØGRAM PRØFG VER 2 ØCT 75')
C
C       ***************************************************
C       ITAPE = INPUT TAPE
        ITAPE = 1
C       ***************************************************
C
        NEØF = 0
        XX=0.0
        INIT=1
C  DIFAC=NUMBER ØF N MILES,KM,ØF HØURS PER INCH ØN PLØT
C  YFAC = ENGINEERING UNITS PER INCH ØN PLØT FØR Y DIRECTIØN
C  LCNT = TIME ANØTATIØN EVERY LCNT PØINTS PLØTTED
C  MIKM = 0 FØR NAUTICAL MILES, 1 FØR KILØMETERS
C       NFILE = NØ. ØF INPUT REELS TØ PRØCESS
        READ (IIN,4) DIFAC, YFAC, LCNT, MIKM, NPLØT, NFILE
    4   FØRMAT (2F10.0, 4I5)
        ØUTPUT DIFAC, YFAC, LCNT, MIKM, NPLØT, NFILE
C  ULIM=UPPER LIMIT FØR PLØTTING DATA VALUE IN ENG UNITS
C  BLIM=BØTTØM LIMIT FØR PLØTTING DATA VALUE IN ENG UNITS
C  DLIM = DISTANCE LIMIT IN INCHES FØR PLØTTING DATA PØINT
C  IXDIR=1 FØR X AXIS PRØPØRTIØNAL TØ DISTANCE ALØNG TRACK
```

```
C        =2 FOR X AXIS PRØPØRTIØNAL TØ TIME ALØNG TRACK
            READ (IIN,6) ULIM, BLIM, DLIM, IXDIR
 6          FØRMAT (3F10.0, I5)
C   XALØW = ALLØWABLE INCHES FØR LENGTH ØF PLØT
C                     BEFØRE REINITIALIZATIØN
C   DMØVE = INCHES TØ BE SPACED BEFØRE REINITIALIZATIØN
            READ (IIN,8) XALØW, DMØVE
 8          FØRMAT (2F10.0)
            ØUTPUT ULIM, BLIM, DLIM, IXDIR, XALØW, DMØVE
            IF(ISW(14))129,129,128
 128        READ (IIN,9) LIMDA, LIMMØ, LIMYR, LIMHM
 9          FØRMAT (6I5)
            ØUTPUT LIMDA, LIMMØ, LIMYR, LIMHM
 111        CALL FIND (LIMDA, LIMMØ, LIMYR, LIMHM,KGDA,KGMØ,KGYR,KGHM,INDK)
            IF (INDK) 111, 129, 129
   129 CØNTINUE
       READ(IIN,9) MSTA
            CALL WHERE (XØRG, YØRG, RFACT)
            CALL PLØT(XØRG,YØRG,-3)
            IF(8990-LCNT)130,132,132
   130      NCNT=0
            GØ TØ 134
   132      NCNT=LCNT
   134      IF(MIKM)14,13,14
    13      CØNV=0.53959
            GØ TØ 52
    14      CØNV=1.0
  50        CØNTINUE
  15        CØNTINUE
          CALL GINØT(ITAPE,JTAPE,KI,KGDA,KGMØ,KGYR,KGHM,IDIF,ISØRC,
         *   RLAT,RLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,
         *   IFFC,IA,IFBC)
    52 CØNTINUE
          IF(KI.EQ.9) GØ TØ 44
          IF(ISW(5).NE.1) GØ TØ 70
          IF(KGHM.EQ.MSTA) GØ TØ 70
          GØ TØ 52
    44 ØUTPUT 'PLØTTING CØMPLETED'
          CALL PLØT(XX,YY,999)
            CALL EXIT
    70      DEPTH=IDEP
            IF(IDEP)78,74,78
    74      HEIGT=ELEV
            GØ TØ 80
    78      HEIGT = -DEPTH
    80      A=K977-977
            A=A*1000.0
            GØBS=ØBSG+A
            BGCØM=BG+TC
   100      PLT(1)=KGHM
            PLT(2)=ISØRC
            PLT(3)=ELEV
            PLT(4)=DEPTH
            PLT(5)=HEIGT
            PLT(6)=FA
            PLT(7)=BG
            PLT(8)=TC
            PLT(9)=BGCØM
            PLT(10)=RFA
            PLT(11)=GØBS
```

```
      KDA=KGDA
      KMØ=KGMØ
      KYR=KGYR
      KHM=KGHM
      DAY=KGDA
      YMØ=KGMØ
      YEAR=KGYR
      HØUR=KGHM
      XLAT=RLAT
      YLØNG=RLØNG
      DATA=PLT(NPLØT)
      IF(INIT-1)25,30,25
   30 DISTM=0.0
      TIMD=0.0
     KDAØ=KGDA
     KMØØ=KGMØ
     KYRØ=KGYR
     KHMØ=KGHM
      INIT=0
      IPEN=3
      GØ TØ 50
   25 TLAT=ABS(XLAT)
      RADI=6371229.0
      DLTDI=(XLAT-XLATØ)*RADI
      DLGDI=(XLØNG-XLNGØ)*RADI*CØS(TLAT)
      DISTM=SQRT((ABS(DLTDI))**2+(ABS(DLGDI))**2)
      CALL CDATE(KDAØ,KMØØ,KYRØ,KHMØ,KDA,KMØ,KYR,KHM,TIMD)
  350 XLATØ=XLAT
      XLNGØ=XLØNG
      KDAØ=KDA
      KMØØ=KMØ
      KYRØ=KYR
      KHMØ=KHM
      YY=DATA/YFAC
      IF(IXDIR-1)54,56,54
   54 DIS=TIMD/DIFAC
      GØ TØ 58
   56   DIS=(DISTM*0.001*CØNV)/DIFAC
   58 IF(DIS-DLIM)365,365,360
  360 XX=XX+3.0
      WRITE(IIØUT,61)KDA,KMØ,KYR,KHM
   61 FØRMAT('DLIM',3I3,I5)
      CALL PLØT(XX,0.0,3)
      GØ TØ 25
  365 IF(DATA-ULIM)368,366,366
  366 WRITE(IIØUT,67)KDA,KMØ,KYR,KHM
   67 FØRMAT('ULIM',3I3,I5)
      GØ TØ 160
  167 WRITE(IIØUT,168)KDA,KMØ,KYR,KHM
  168 FØRMAT('BLIM',3I3,I5)
  160 XX=XX+DIS
      CALL PLØT(XX,0.0,3)
      IPEN=3
      GØ TØ 15
  368 IF(BLIM-DATA)369,167,167
  369 XX=XX+DIS
C   CHECKING WITHIN ALLØWABLE PLØT DISTANCE
  170 IF(XX-XALØW)180,172,172
  172 XX=XX+DMØVE
      IPEN=3
      CALL PLØT(XX,YY,IPEN)
      CALL WHERE (XØRG, YØRG, RFACT)
      CALL PLØT(XØRG,0.0,-3)
      XX=0.0
      CALL PLØT(XX,YY,IPEN)
      CALL SPØT(XX,YY)
      IPEN=2
      GØ TØ 72
  180 CALL PLØT(XX,YY,IPEN)
      CALL SPØT(XX,YY)
      IPEN=2
   72 CØNTINUE
      IF(NCNT-LCNT)120,300,120
  300 CALL NUMBER (XX, -5.0, 0.07, DAY, 90.0, -1)
      CALL NUMBER (XX, -4.8, 0.07, YMØ, 90.0, -1)
      CALL NUMBER (XX, -4.6, 0.07, YEAR, 90.0, -1)
      CALL NUMBER (XX, -4.4, 0.07, HØUR, 90.0, -1)
      CALL PLØT(XX,YY,3)
      NCNT=1
      GØ TØ 15
  120 NCNT=NCNT+1
     ØUTPUT NCNT
      GØ TØ 15
      END
```

```
                        HEX      DEC                              HEX      DEC                              HEX      DEC
NAME    TYPE CLASS      LØC      WØRDS    NAME   TYPE CLASS       LØC      WØRDS    NAME   TYPE CLASS       LØC      WØRDS
----    ---- -----    -------    -----    ----   ---- -----     -------    -----    ----   ---- -----     -------    -----
A          R SCALR    00453 V       1     ABS       R SPRØG     INTRIN              BG        R SCALR     00448 V       1
BGCØM      R SCALR    00455 V       1     BLIM      R SCALR     0042B V       1     CDATE       SPRØG     EXTERN
CRNV       R SCALR    0043E V       1     CØS       R SPRØG     INTRIN              DATA      R SCALR     00460 V       1
DAY        R SCALR    0045A V       1     DEPTH     R SCALR     00451 V       1     DIFAC     R SCALR     00424 V       1
DIS        R SCALR    0046F V       1     DISTM     R SCALR     00461 V       1     DLGDI     R SCALR     0046C V       1
DLIM       R SCALR    0042C V       1     DLTDI     R SCALR     0046A V       1     DMØVE     R SCALR     0042F V       1
ELEV       R SCALR    00443 V       1     EXIT        SPRØG     EXTERN              FA        R SCALR     00447 V       1
FIND         SPRØG    EXTERN              GINØT       SPRØG     EXTERN              GØBS      R SCALR     00454 V       1
HEIGT      R SCALR    00452 V       1     HØUR      R SCALR     0045D V       1     IA        I ARRAY     0000F V      35
IBUF       I ARRAY    00032 V    1000     IDEP      I SCALR     00446 V       1     IDIF      I SCALR     0043F V       1
IELC       I SCALR    0044A V       1     IFBC      I SCALR     0044F V       1     IFFC      I SCALR     0044E V       1
IGC        I SCALR    0044B V       1     IIN       I SCALR     0041A V       1     IIØUT     I SCALR     0041B V       1
INDK       I SCALR    00438 V       1     INIT      I SCALR     00423 V       1     INNT      I SCALR     0041F V       1
IPEN       I SCALR    00467 V       1     IREGC     I SCALR     0044D V       1     ISØRC     I SCALR     00440 V       1
ISW        I SPRØG    EXTERN              ITAPE     I SCALR     00420 V       1     IXDIR     I SCALR     0042D V       1
JTAPE      I SCALR    0041D V       1     KDA       I SCALR     00456 V       1     KDAØ      I SCALR     00463 V       1
KGDA       I SCALR    00434 V       1     KGHM      I SCALR     00437 V       1     KGMØ      I SCALR     00435 V       1
KGYR       I SCALR    00436 V       1     KHM       I SCALR     00459 V       1     KHMØ      I SCALR     00466 V       1
KI         I SCALR    0041E V       1     KK        I SCALR     0041C V       1     KMØ       I SCALR     00457 V       1
KMØØ       I SCALR    00464 V       1     KYR       I SCALR     00458 V       1     KYRØ      I SCALR     00465 V       1
K977       I SCALR    00444 V       1     LCNT      I SCALR     00426 V       1     LIMDA     I SCALR     00430 V       1
LIMHM      I SCALR    00433 V       1     LIMMØ     I SCALR     00431 V       1     LIMYR     I SCALR     00432 V       1
MIKM       I SCALR    00427 V       1     MSTA      I SCALR     00439 V       1     NCNT      I SCALR     0043D V       1
NEØF       I SCALR    00421 V       1     NFILE     I SCALR     00429 V       1     NPLØT     I SCALR     00428 V       1
NUMBER       SPRØG    EXTERN              ØBSG      R SCALR     00445 V       1     PLØT        SPRØG     EXTERN
PLØTS        SPRØG    EXTERN              PLT       R ARRAY     00000 V      15     RADI      R SCALR     00469 V       1
RFA        R SCALR    0044C V       1     RFACT     R SCALR     0043C V       1     RLAT      R SCALR     00441 V       1
RLØNG      R SCALR    00442 V       1     SPØT        SPRØG     EXTERN              SQRT      R SPRØG     INTRIN
TC         R SCALR    00449 V       1     TIMD      R SCALR     00462 V       1     TLAT      R SCALR     00468 V       1
ULIM       R SCALR    0042A V       1     WHERE       SPRØG     EXTERN              XALØW     R SCALR     0042E V       1
XLAT       R SCALR    0045E V       1     XLATØ     R SCALR     0046B V       1     XLNGØ     R SCALR     0046E V       1
XLØNG      R SCALR    0046D V       1     XØRG      R SCALR     0043A V       1     XX        R SCALR     00422 V       1
YEAR       R SCALR    0045C V       1     YFAC      R SCALR     00425 V       1     YLØNG     R SCALR     0045F V       1
YMØ        R SCALR    0045B V       1     YØRG      R SCALR     0043B V       1     YY        R SCALR     00450 V       1


         HEX              HEX              HEX              HEX              HEX              HEX
LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
    4   00037        6   00062        8   0006C        9   0009C       13   000DB       14   000DE
   15   000E0       25   00177       30   00166       44   00107       50   000E0       52   000F8
   54   001AC       56   00180       58   00185       61   001C3       67   001D9       70   00118
   72   0022D       74   0011D       78   00120       80   00123      100   00130      111   000B5
  120   00258      128   00094      129   000C2      130   000D4      132   000D7      134   000D9
  160   001EC      167   001DF      168   001E7      170   001FD      172   00200      180   00222
  300   00230      350   0019A      360   00188      365   001CE      366   001D1      368   001F7
  369   001FA      600   0001C

LØCAL VARIABLES (1136 WØRDS):

   00000 PLT       0000F IA        00032 IBUF      0041A IIN       0041B IIØUT     0041C KK
   0041D JTAPE     0041E KI        0041F INNT      00420 ITAPE     00421 NEØF      00422 XX
   00423 INIT      00424 DIFAC     00425 YFAC      00426 LCNT      00427 MIKM      00428 NPLØT
   00429 NFILE     0042A ULIM      0042B BLIM      0042C DLIM      0042D IXDIR     0042E XALØW
   0042F DMØVE     00430 LIMDA     00431 LIMMØ     00432 LIMYR     00433 LIMHM     00434 KGDA
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00435 KGMØ     00436 KGYR     00437 KGHM     00438 INDK     00439 MSTA     0043A XØRG
0043B YØRG     0043C RFACT    0043D NCNT     0043E CØNV     0043F IDIF     00440 ISØRC
00441 RLAT     00442 RLØNG    00443 ELEV     00444 K977     00445 ØBSG     00446 IDEP
00447 FA       00448 BG       00449 TC       0044A IELC     0044B IGC      0044C RFA
0044D IREGC    0044E IFFC     0044F IFØC     00450 YY       00451 DEPTH    00452 HEIGT
00453 A        00454 GØHS     00455 BGCØM    00456 KDA      00457 KMØ      00458 KYR
00459 KHM      0045A DAY      0045B YMØ      0045C YEAR     0045D HØUR     0045E XLAT
0045F YLØNG    00460 DATA     00461 DISTM    00462 TIMD     00463 KDAØ     00464 KMØØ
00465 KYRØ     00466 KHMØ     00467 IPEN     00468 TLAT     00469 RADI     0046A DLTDI
0046B XLATØ    0046C DLGDI    0046D XLØNG    0046E XLNGØ    0046F DIS

BLANK CØMMØN (0 WØRDS)

INTRINSIC SUBPRØGRAMS USED:

   ABS        CØS        SQRT

EXTERNAL SUBPRØGRAMS REQUIRED:

   CDATE      EXIT       FIND       GINØT      ISW        NUMBER     PLØT       PLØTS
   SPØT       WHERE      F:101      F:102      F:103      F:104      F:105      F:106
   F:108      M:DØ       M:ØC       9BCDREAD   9BCDWRIT   9CØS       9ENDIØL    9INITIAL
   9IØDATA    9ITØR      9PRINT     9SQRT

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                   DEC       HEX
                   WØRDS     WØRDS
                   -----     -----
 GENERATED CØDE:    611      00263    (NØ MEMØRY PRØTECTIØN)
      CØNSTANTS:     21      00015
LØCAL VARIABLES:   1136      00470
          TEMPS:      1      00001
                   -----     -----
  TØTAL PRØGRAM:   1769      006E9
```

COMPILED 6 MAY 74

```
C       PRØGRAM PRØJ4
C
C       VERSIØN  6 MAY 74, CHANGE USE ØF SINØ2 TØ SINØT
C        VERSIØN ØF 4 FEB 1973, TØ ØUTPUT DECIMAL DEGREES IN IA FIELD
C        VERSIØN Ø F 25 AUGUST 1972,  TØ UPDATE YINØT CALLING ARGUMENTS
C        VERSIØN ØF 14 MARCH 1972,ADDING IMANT TØ ARG LIST TØ PINØT
C        VERSIØN ØF 29 AUGUST 1971
C
C PRØGRAM PRØJ4,  PRØJECTS SEVERAL DATA FØRMATS TØ A STRAIGHT LINE
C         CAN PRØCESS DIFFERENT FØRMATS IN SAME RUN
C        ØN FØRMAT CHØICE IN PUT CARD,  PUT JFMTS IN ØRDER DESIRED FØR
C            PRØCESSING DURING RUN
C
C    JFMT ALLØWS CHØICE ØF DATA FØRMAT TØ BE PRØCESSED
C         JFMT = 1  FØR GSUM FØRMAT
C              = 2  FØR SEAG1 INPUT FØRMAT,  ØUTPUT IS GSUM FØRMAT
C              = 3  FØR SPFMT FØRMAT
C              = 4  FØR SEISMICITY DATA FØRMAT
C              = 7 FØR ACTIVE VØLCANØES
C
C
C        ITAPE IS SET TØ (JFMT + 2)
C        JTAPE = 2
      KTAPE=20
C
C
C
C     SHØULD HAVE ASSIGN CARDS FØR UNITS 2,3,4,5,6,9,20
C
C        UNIT 2 IS FØR ØUTPUT ØF PRØJECTED DATA
C        UNIT 3 FØR GSUM
C        UNIT 4 FØR SEAG1
C        UNIT 5 FØR SPFMT DATA
C        UNIT 6 FØR SEISMICITY DATA
C        UNIT 9 FØR ACTIVE VØLCANØE DATA
C        UNIT 20 FØR DISK STØRAGE ØF GSUM DATA IF ISW(3)=1
C
C
C
C     TØ STØP PRØCESSING MAKE START DAY=99
C     IF START DAY = 99, PRØGRAM GØES TØ 1000 AND CHECKS INPUT FØRMAT
C           LABELS FØR FØRMAT CØDE NUMBER ØF ZERØ
C
C
C        SSW(3) = 1 TØ ØUTPUT GSUM DATA ØNTØ A DISK FILE,  ØNLY
C             APPLIES WHEN JFMT = 1 ØR 2
C
      DIMENSIØN IA(35),JF(10)
      DIMENSIØN            IDESC(6),VEL(8),THICK(8),X(8)
      DIMENSIØN NØW(4)
      DIMENSIØN IZ( 9),IW(35)
      CALL STAT
      NWON=1
      IIN=105
      IIOUT=108
      JTAPE=2
      JFCT=1
      JJREC=0
      I8=8
      IREC1=1
      DEGRA=1.745329E-02
      RADEG=57.29578
C    PRINT DATE AND TIME OF JOB ON HEADING
      CALL TODAY(NOW)
      WRITE(IIOUT,13) NOW
   13 FORMAT(1X,4A4)
      WRITE(IIOUT,16)
   16 FORMAT('PROJ4 RUN, VERSION OF 6 MAY 1974')
C
C     INITIALIZING PROJECTION REQUIREMENTS
C
      KK=0
      CALL        PROJ(KK,RLAT,RLONG,PLAT,PLONG,DISR,DIST)
C
C
C          READING ORDER THAT DATA FORMATS ARE TO BE PROCESSED
C
      READ(IIN,20)JFMT,JF(2),JF(3),JF(4),JF(5),JF(6),JF(7),JF(8),JF(9)
   20 FORMAT(9I5)
C
C
C      START OF READING NEW DATA FORMAT BEGINS HERE WITH SSW CARD
C
   18 INIT=ISW(-2)
      CALL SETSKP(IND)
     WRITE(IIOUT,25) JFMT
   25 FORMAT('JFMT =',I4)
      ITAPE=JFMT+2
      GO TO (40,50,80,90,1000,1000,110)JFMT
   40 KK=0
      CALL        GINOT(ITAPE,JTAPE,KK,KGDA,KGMO,
     1  KGYR,KGHM,IDIF,ISORC,RLAT,RLONG,ELEV,K977,OBSG,
     2  IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
      GO TO 100
   50 READ(IIN,55)ISORC,IELC,IGC
   55 FORMAT(3I5)
      ELEV=0.0
      IOGR=08
      TC=99.9
      RFA=0.0
      IREGC=0.0
      IFFC=0.0
      IFBC=0
      KK=0
      CALL        SINOT(ITAPE,JTAPE,KK,KGDA,KGMO,KGYR,KGHM,IDIF,RLAT,
     1   RLØNG,KVN,KVE,K977,IØGR,KFA,KBG,KCVN,KCVE,
     2   KCDM,MTDC,MT,MAG1,MAG2,KETVØ)
        CALL        GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
     1   KGYR,KGHM,IDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
     2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
        GØ TØ 100
   80   CØNTINUE
        KK=0
        CALL        FINØT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,
     1  LØNG,LØM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,
     2  DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
        GØ TØ 100
   90   CØNTINUE
        KK=0
        CALL        YINØT(ITAPE,JTAPE,KK,
     1 ISR1,ISR2,KDA,KMØ,KYR,KHM,SEC,DLAT,KSN,DLØN,KWE,DEPT,AMAG,IMB,
     2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
     3 ICE,IMG,IAUTH,IQHY,NPP,IØQ,ILM,IS1,IS2)
        GØ TØ 100
C     FØR PRESENT THERE IS NØ VØLCANØE STREAM
  110   GØ TØ 1000
  100   CØNTINUE
C       READING START & END DATE & ISKP CARD FØR EACH INPUT FØRMAT
        IFLAG=0
        READ(IIN,2)ISTDA,ISTMØ,ISTYR,ISTHM,IENDA,IENMØ,IENYR,IENHM,ISKP
    2   FØRMAT(       3I2,I4,5X,3I2,I4,5X,I5)
        WRITE(IIØUT,6365)ISTDA,ISTMØ,ISTYR,ISTHM,IENDA,IENMØ,IENYR,
     1  IENHM,ISKP
 6365   FØRMAT('PRØJ4:  START DATE ',3I2,I4,', END DATE ',3I2,I4,', ISKP=
     1',I4)
        IF(ISKP.EG.0) GØ TØ  8
        CALL SKPREC(ITAPE,ISKP)
        GØ TØ(999,8,999,999,999,999) IND
    8   CØNTINUE
C      CHECK IF END ØF PRØCESSING
C       BY CHECK IF ISTDA=99
       IF (ISTDA.EQ.99) GØ TØ 992
C
C    INITIALIZATIØN NØW CØMPLETE
C
C     READ IN DATA
C
  150   GØ TØ (200,300,400,500,1000,1000,530)JFMT
  200   KK=1
        CALL        GINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,
     1   KGYR,KGHM,IDIF,ISØRC,RLAT,RLØNG,ELEV,K977,ØBSG,
     2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
        IF(KK-9)210,1000,210
  210   GØ TØ 186
  300   KK=1
        CALL        SINØT(ITAPE,JTAPE,KK,KGDA,KGMØ,KGYR,KGHM,IDIF,RLAT,
     1   RLØNG,KVN,KVE,K977,IØGR,KFA,KBG,KCVN,KCVE,
     2   KCDM,MTDC,MT,MAG1,MAG2,KETVØ)
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```
          IF(KK-9)310,1000,310
    310   DBSG=IØGR
          ØBSG=DBSG*0.1
          FA=FLØAT(KFA)*0.1
          ØG=FLØAT(KØG)*0.1
          GØ TØ 186
    400   KK=1
          CALL        PINØT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,
        1  LØNG,LØM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,
        2  DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
          IF(KK-9)410,1000,410
    410   RLATM=LATM
          RLØM=LØM
          CALL NAVIN(LAT,RLATM,KNS,LØNG,RLØM,KEW,RLAT,RLØNG)
          GØ TØ 186
    500   KK=1
          CALL        YINØT(ITAPE,JTAPE,KK,
        1 ISR1,ISR2,KDA,KMØ,KYR,KHM,SEC,DLAT,KSN,DLØN,KWE,DEPT,AMAG,IMB,
        2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
        3 ICE,IMG,IAUTH,IGHY,NPP,IØQ,ILM,IS1,IS2)
          IF(KK-9)510,1000,510
    510   KL=0
          CALL        DNAV(DLAT,KSN,DLØN,KWE,RLAT,RLØNG,KL)
          GØ TØ 186
    530   GØ TØ 1000
   186    CØNTINUE
           IF(KK-9)190,992,190
  C  CHECKING FØR ERR ØN INPUT DATA
    190   JDA=KGDA
          JMØ=KGMØ
          JYR=KGYR
          JHM=KGHM
  C      IFLAG IS A FLAG TØ ALLØW SKIPPING THE FIRST CALL TØ FIND
  C       IF WE HAVE ALREADY  FØUND THE STARTING DATE
  C
          IF(IFLAG.NE.0) GØ TØ 82
          CALL FIND(ISTDA,ISTMØ,ISTYR,ISTHM,JDA,JMØ,JYR,JHM,INDK)
          IF(INDK.EQ.-1) GØ TØ 150
          IFLAG=1
    82    CØNTINUE
          IF(IENYR.EQ.0) GØ TØ 851
          CALL FIND(IENDA,IENMØ,IENYR,IENHM,JDA,JMØ,JYR,JHM,INDK)
          IF(INDK.EQ.1) GØ TØ  995
   851    CØNTINUE
    852   CØNTINUE
  C
  C
  C    START PRØCESSING
  C
  C
          KK=NWØN
          CALL        PRØJ(KK,RLAT,RLØNG,PLAT,PLØNG,DISR,DIST)
  C  CHECKING IF DATA PØINT IS WITHIN AREA AND DISTANCE FRØM PRØJ LINE
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```
      IF(KK+2)599,150,599
  599 CONTINUE
      JJREC=JJREC+1
C     X=DISR*6371.0
C     OUTPUT X
C
C  OUTPUT DATA
C
      GO TO  (600,600,700,800,1000,1000,830)JFMT
  600 KK=-2
C
C      LOGIC OFR PUTTING RLAT AND RLONG VALUES IN ARRAY 'IA'
C
C   GROUPING VARIABLES FOR OUTPUT UNDER ARRAY IA
       DLAT=RLAT*RADEG
       DLONG=RLONG*RADEG
      ENCODE(35,608,IZ) DLAT,DLONG
  608 FORMAT(2F9.4,17X)
      CALL UNPKBY(IZ,IW,35)
      DO 609 J=1,35
      IA(J)=ISL(IW(J),24)
  609 CONTINUE
C
C  PUTS PLAT AND LONG IN POSITION OF RLAT AND RLONG
C
      CALL        GINOT(ITAPE,JTAPE,KK,KGDA,KGMO,
     1  KGYR,KGHM,IDIF,ISORC,PLAT,PLONG,ELEV,K977,OBSG,
     2  IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
      IF(ISW(3))900,900,612
  612 WRITE(KTAPE,12)IREC1,ISORC,KGDA,KGMO,KGYR,KGHM,
     1 PLAT,PLONG,ELEV,K977,OBSG,IDEP,FA,BG,TC,IELC,IGC,
     2 RFA,IREGC,IFFC,IA,IFBC
   12 FORMAT(I1,I4,3I2,I4,2F9.6,F7.2,I3,F6.2,I5,2F6.1,F4.1,
     1 2I2,F6.1,I1,I2,35A1,I2)
      GO TO 900
  700 KK=-2
      KDEC=0
      CALL NAVOT(PLAT,PLONG,LAT,RLATM,KNS,
     1 LONG,RLOM,KEW,KDEC)
      LATM=RLATM
      LOM=RLOM
      CALL        FINOT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,
     1 LONG,LOM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,
     2 DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
      GO TO 900
  800 KK=-2
      KL=-1
      CALL        DNAV(DLAT,KSN,DLON,KWE,PLAT,PLONG,KL)
      CALL        YINOT(ITAPE,JTAPE,KK,
     1 ISR1,ISR2,KDA,KMO,KYR,KHM,SEC,DLAT,KSN,DLON,KWE,DEPT,AMAG,IMB,
     2 ISOS,INTS,IDIAS,ITSU,ISEICH,IVOLC,INONT,IWG,IFEG,IMS,IASP,IZH,
     3 ICE,IMG,IAUTH,IQHY,NPP,IOQ,ILM,IS1,IS2)
      GO TO 900
  830  GØ TØ 1000
  900  IF(IENYR.EQ.0) GØ TØ 951
       CALL FIND(IENDA,IENMØ,IENYR,IENHM,JDA,JMØ,JYR,JHM,INDK)
       IF(INDK.EQ.0) GØ TØ  100
       GØ TØ 150
  951    GØ TØ 150
  992  GØ TØ 1000
  994 WRITE (IIØUT,993) JJREC
993   FØRMAT('END ØF PRØCESSING,  RECØRDS ØUTPUT = ',I8)
       CALL EXIT
995    WRITE(IIØUT,996) JDA,JMØ,JYR,JHM
996    FØRMAT('END DATE PASSED',2X,3I2,I4)
       CALL EXIT
999    WRITE(IIØUT,998) IND
998    FØRMAT('ERRØR IN SKPREC,IND=',I3)
       CALL EXIT
C
C      END ØF AN INPUT STREAM
C
 1000 CØNTINUE
C
C         WRITING AN 8 ØN ØUTPUT STREAM FØR INPUT TØ MØDPLØT PRØGRAM
C
C
C     IF JFMT = SEISMICITY ØR VØLCANØES WRITE ØNLY ØN  8 , ØTHERWISE
C                    WRITE TWØ  8 'S.
C
       IF (JFMT-4)1002,1008,1002
 1002  IF(JFMT-7)1007,1008,1007
 1007  WRITE(JTAPE,1001)I8
 1008  WRITE(JTAPE,1001)I8
       JFCT=JFCT+1
       IF(JF(JFCT))994,994,1005
 1005  JFMT=JF(JFCT)
C
C      WRITING JFMT NUMBER ØN ØUTPUT FØR INPUT TØ MØDPLØT PRØGRAM
C
       WRITE(JTAPE,1001)JFMT
 1001  FØRMAT(I1,20X)
       GØ TØ 18
       END
```

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                              HEX     DEC                                     HEX     DEC                                     HEX     DEC
NAME    TYPE CLASS           LØC     WØRDS        NAME    TYPE CLASS          LØC     WØRDS        NAME    TYPE CLASS          LØC     WØRDS
----    ---- -----         -------   -----        ----    ---- -----        -------   -----        ----    ---- -----        -------   -----
AMAG       R SCALR         000D6 V       1        AVWTN      R SCALR        000C6 V       1        AVWTW      R SCALR        000C9 V       1
BG         R SCALR         0009C V       1        CRVN       R SCALR        000C4 V       1        CRVW       R SCALR        000C7 V       1
CBSG       R SCALR         000F7 V       1        DEGRA      R SCALR        00084 V       1        DEPT       R SCALR        000D5 V       1
DINE       R SCALR         000C2 V       1        DISR       R SCALR        0008B V       1        DIST       R SCALR        0008C V       1
DLAT       R SCALR         000D1 V       1        DLØN       R SCALR        000D3 V       1        DLØNG      R SCALR        00100 V       1
DNAV         SPRØG         EXTERN                 ELEV       R SCALR        00097 V       1        EXIT         SPRØG        EXTERN
FA         R SCALR         0009B V       1        FIND         SPRØG        EXTERN                 FLØAT      R SPRØG        INTRIN
GINØT        SPRØG         EXTERN                 IA         I ARRAY        00001 V      35        IASP       I SCALR        000E2 V       1
IAUTH      I SCALR         000E6 V       1        ICE        I SCALR        000E4 V       1        IDEP       I SCALR        0009A V       1
IDESC      I ARRAY         0002E V       6        IDIAS      I SCALR        000DA V       1        IDIF       I SCALR        00095 V       1
IELC       I SCALR         0009E V       1        IENDA      I SCALR        000F2 V       1        IENHM      I SCALR        000F5 V       1
IENMØ      I SCALR         000F3 V       1        IENYR      I SCALR        000F4 V       1        IFBC       I SCALR        000A3 V       1
IFEG       I SCALR         000E0 V       1        IFFC       I SCALR        000A2 V       1        IFLAG      I SCALR        000ED V       1
IGC        I SCALR         0009F V       1        IIN        I SCALR        0007D V       1        IØUT       I SCALR        0007E V       1
ILM        I SCALR         000EA V       1        IMANT      I SCALR        000BA V       1        IMB        I SCALR        000D7 V       1
IMG        I SCALR         000E5 V       1        IMS        I SCALR        000E1 V       1        IND        I SCALR        0008F V       1
INDK       I SCALR         000FF V       1        INIT       I SCALR        0008E V       1        INØNT      I SCALR        000DE V       1
INTS       I SCALR         000D9 V       1        IØGR       I SCALR        000A4 V       1        IØQ        I SCALR        000E9 V       1
IGHY       I SCALR         000E7 V       1        IREC1      I SCALR        00083 V       1        IREGC      I SCALR        000A1 V       1
ISEICH     I SCALR         000DC V       1        ISKP       I SCALR        000F6 V       1        ISL        I SPRØG        INTRIN
ISØRC      I SCALR         00096 V       1        ISØS       I SCALR        000D8 V       1        ISR1       I SCALR        000CA V       1
ISR2       I SCALR         000CB V       1        ISTA       I SCALR        000B2 V       1        ISTDA      I SCALR        000EE V       1
ISTHM      I SCALR         000F1 V       1        ISTMØ      I SCALR        000EF V       1        ISTYR      I SCALR        000F0 V       1
ISW        I SPRØG         EXTERN                 IS1        I SCALR        000EB V       1        IS2        I SCALR        000EC V       1
ITAPE      I SCALR         00090 V       1        ITSU       I SCALR        000DB V       1        IVØLC      I SCALR        000DD V       1
IW         I ARRAY         00059 V      35        IWG        I SCALR        000DF V       1        IYR        I SCALR        000C1 V       1
IZ         I ARRAY         00050 V       9        IZH        I SCALR        000E3 V       1        I8         I SCALR        00082 V       1
J          I SCALR         00101 V       1        JDA        I SCALR        000FB V       1        JF         I ARRAY        00024 V      10
JFCT       I SCALR         00080 V       1        JFMT       I SCALR        0008D V       1        JHM        I SCALR        000FE V       1
JJREC      I SCALR         00081 V       1        JMØ        I SCALR        000FC V       1        JTAPE      I SCALR        0007F V       1
JYR        I SCALR         000FD V       1        KBG        I SCALR        000A9 V       1        KCDM       I SCALR        000AC V       1
KCVE       I SCALR         000AB V       1        KCVN       I SCALR        000AA V       1        KDA        I SCALR        000CC V       1
KDEC       I SCALR         00102 V       1        KETVØ      I SCALR        000B1 V       1        KEW        I SCALR        000B9 V       1
KEY        I SCALR         000B3 V       1        KFA        I SCALR        000A8 V       1        KGDA       I SCALR        00091 V       1
KGHM       I SCALR         00094 V       1        KGMØ       I SCALR        00092 V       1        KGYR       I SCALR        00093 V       1
KHM        I SCALR         000CF V       1        KK         I SCALR        00086 V       1        KL         I SCALR        000FA V       1
KMØ        I SCALR         000CD V       1        KNS        I SCALR        000B6 V       1        KSN        I SCALR        000D2 V       1
KTAPE      I SCALR         000C0 V       1        KVE        I SCALR        000A7 V       1        KVN        I SCALR        000A6 V       1
KWE        I SCALR         000D4 V       1        KYR        I SCALR        000CE V       1        K977       I SCALR        00098 V       1
LAT        I SCALR         000B4 V       1        LATM       I SCALR        00085 V       1        LØM        I SCALR        000B8 V       1
LØNG       I SCALR         000B7 V       1        MAG1       I SCALR        000AF V       1        MAG2       I SCALR        000B0 V       1
MET        I SCALR         00 C0 V       1        MT         I SCALR        000AE V       1        MTDC       I SCALR        000AD V       1
NAVIN        SPRØG         EXTERN                 NAVØT        SPRØG        EXTERN                 NELEV      I SCALR        000BB V       1
NØW        I ARRAY         0004C V       4        NPP        I SCALR        000E8 V       1        NWØN       I SCALR        0007C V       1
N1         I SCALR         000BC V       1        N2         I SCALR        0008D V       1        N3         I SCALR        000BE V       1
N4         I SCALR         000BF V       1        ØØ         R SCALR        000A5 V       1        ØBSG       R SCALR        00099 V       1
FINØT        SPRØG         EXTERN                 PLAT       R SCALR        00089 V       1        PLØNG      R SCALR        0008A V       1
PRØJ         SPRØG         EXTERN                 RADEG      R SCALR        00085 V       1        RFA        R SCALR        000AD V       1
RLAT       R SCALR         00087 V       1        RLATM      R SCALR        000F8 V       1        RLØM       R SCALR        000F9 V       1
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RLØNG     R SCALR  00088 V      1       SEC      R SCALR  000D0 V      1       SETSKP       SPRØG  EXTERN
SINØT       SPRØG  EXTERN               SKPREC     SPRØG  EXTERN               STAT         SPRØG  EXTERN
STHIK     R SCALR  000C3 V      1       TC       R SCALR  0009D V      1       THICK      R ARRAY  0003C V        8
TØDAY       SPRØG  EXTERN               UNPKBY     SPRØG  EXTERN               VEL        R ARRAY  00034 V        8
WGTN      R SCALR  000C5 V      1       WGTW     R SCALR  000C8 V      1       X          R ARRAY  00044 V        8
YINØT       SPRØG  EXTERN

         HEX              HEX              HEX              HEX              HEX              HEX
LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
    2   0013B        8   00171       12   002E4       13   00022       16   00029       18   0004E
   20   0004B       25   0005A       40   0006E       50   0008C       55   00093       80   000DD
   82   0025C       90   00100      100   0012C      110   0012B      150   00174      186   0023F
  190   00242      200   00180      210   001A0      300   001A1      310   001C0      400   001CF
  410   001F4      500   00205      510   00232      530   0023E      599   0027A      600   00287
  608   00296      609   002A5      612   002C7      700   002F8      800   0032E      830   00364
  851   0026C      852   0026C      900   00365      951   00375      992   00376      993   0037C
  994   00377      995   0038A      996   00392      998   003A2      999   0039D     1000   003AC
 1001   003C8     1002   003AF     1005   003C0     1007   003B2     1008   003B7     6365   0014F

LØCAL VARIABLES (259 WØRDS):

   00000 KTAPE     00001 IA        00024 JF        0002E IDESC     00034 VEL       0003C THICK
   00044 X         0004C NØW       0005C IZ        00059 IW        0007C NWØN      0007D IIN
   0007E IIØUT     0007F JTAPE     00080 JFCT      00081 JJREC     00082 I8        00083 IREC1
   00084 DEGRA     00085 RADEG     00086 KK        00087 RLAT      00088 RLØNG     00089 PLAT
   0008A PLØNG     0008B CISR      0008C DIST      0008D JFMT      0008E INIT      0008F IND
   00090 ITAPE     00091 KGDA      00092 KGMØ      00093 KGYR      00094 KGHM      00095 IDIF
   00096 ISØRC     00097 ELEV      00098 K977      00099 ØBSG      0009A IDEP      0009B FA
   0009C BG        0009D TC        0009E IELC      0009F IGC       000A0 RFA       000A1 IREGC
   000A2 IFFC      000A3 IFBC      000A4 IØGR      000A5 ØB        000A6 KVN       000A7 KVE
   000A8 KFA       000A9 KBG       000AA KCVN      000AB KCVE      000AC KCDM      000AD MTDC
   000AE MT        000AF MAG1      000BC MAG2      000B1 KETVØ     000B2 ISTA      000B3 KEY
   000B4 LAT       000B5 LATM      000B6 KNS       000B7 LØNG      000B8 LØM       000B9 KEW
   000BA IMANT     000BB NELEV     000BC N1        000BD N2        000BE N3        000BF N4
   000C0 MET       000C1 IYR       000C2 DINE      000C3 STHIK     000C4 CRVN      000C5 WGTN
   000C6 AVWTN     000C7 CRVW      000C8 WGTW      000C9 AVWTW     000CA ISR1      000CB ISR2
   000CC KDA       000CD KMØ       000CE KYR       000CF KHM       000D0 SEC       000D1 DLAT
   000D2 KSN       000D3 DLPN      000D4 KWE       000D5 DEPT      000D6 AMAG      000D7 I[illegible]
   000D8 ISØS      000D9 INTS      000DA IDIAS     000DB ITSU      000DC ISEICH    000DD IVBLC
   000DE INØNT     000DF IWG       000EC IFEG      000E1 IMS       000E2 IASP      000E3 IZH
   000E4 ICE       000E5 IMG       000E6 IAUTH     000E7 IQHY      000E8 NPP       000E9 IØQ
   000EA ILM       000EB IS1       000FC IS2       000ED IFLAG     000EE ISTDA     000EF ISTM[illegible]
   000FC ISTYR     000F1 ISTHM     000F2 IENDA     000F3 IENMØ     000F4 IENYR     000F5 IEN[illegible]
   000F6 ISKP      000F7 DBSG      000F8 RLATM     000F9 RLØM      000FA KL        [illegible]
   000FC JMØ       000FD JYR       000FE JHM       000FF INDK      00100 [illegible]NG   00101 [illegible]
   00102 KDEC

BLANK CØMMØN (0 WØRDS)
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INTRINSIC SUBPRØGRAMS USED:

   FLØAT    .  ISL

EXTERNAL SUBPRØGRAMS REQUIRED:

   DNAV       EXIT       FIND       GINØT      ISW        NAVIN      NAVØT      PINØT
   PRØJ       SETSKP     SINØT      SKPREC     STAT       TØDAY      UNPKBY     YINØT
   F:101      F:102      F:103      F:104      F:105      F:106      F:108      M:D8
   M:8C       9BCDREAD   9BCDWRIT   9ENCØDE    9ENDIØL    9INITIAL   9IØDATA    9IØLUSA
   9ITØR      9RTØI

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                        DEC        HEX
                       WØRDS      WØRDS
                       -----      -----
  GENERATED CØDE:       972       003CC     (NØ MEMØRY PRØTECTIØN)
       CØNSTANTS:         7       00007
 LØCAL VARIABLES:       259       00103
           TEMPS:         0       00000
                       -----      -----
   TØTAL PRØGRAM:      1238       004D6
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```
C          PROGRAM SAINT2
C          VERSION OF 7 AUG 1975, TO PROVIDE FOR MAGNETIC TAPE TAPE INPUT
C          AND OUTPUT OF GSUM RECORDS
C          VERSION OF 7 AUG 1974, TO IDENTIFY XSCAL
C          VERSION OF 4 FEB 1973, TO REALLY CHANGE GSUM OUTPUT TO DEC DEG
C          VERSION OF 8 SEPT 1972,  TO CHANGE PCS DATA INPUT FORMAT
C               AND TO ALLOW GSUM INPUT ON DEVICES OTHER THAN CARDS
C          VERSION OF 21 AUGUST 1972, TO INPUT AND OUTPUT GSUM IN DEC DEG
C    MOD MAY 20,1971 BY FOLINSBEE TO FIT UNDER NEW MONITOR(ARRAYS INTO COMMON,
C   PROGRAM SAINT2,  MODIFIED FROM SAINT ON 27 NOV 1970 BY C. BOWIN
C     THIS IS A PROGRAM WRITTEN TO  INTERPOLATE DATA AT EVEN INTERVALS
        DIMENSION A(10)
       DIMENSION NAME(5),SCALE(5),AMINV(5),AMAXV(5),Y(5)
        COMMON   RLAT(1000),RLONG(1000),GRV(1000),FAIR(1000),BOUG(1000),
     1 DEPTH(1000),ELEV(1000),DIST(1000),FATP(1000),HINT(1000)
       DIMENSION KEY(60)
       DIMENSION IAL(10),VAL(10),ARG(10)
        DIMENSION JA(10),JB(30)
       DOUBLE PRECISION G
       DATA NAME/'GRV ','FAIR','BOUG','DEPH','ELEV'/
       DATA KEY/'U008','0001','CC1 ','    ','    ',' 0 ',6*'    ','01A0'
     A,'0730','08A ',45*'    '/
        DATA EPS/0.5/
C
C   SSW(1) = 1 TO SORT DATA
C   SSW(2) = 1 TO PUNCH SORTED DATA
C   SSW(3) = 1 TO PRINT SORTED DATA
C   SSW(4) = 1 TO INTERPOLATE VALUES
C   SSW(5) = 1 TO PUNCH INTERPOLATED DATA IN GSUM FMT
C   SSW(6) = 1 TO PUNCH INTERPOLATED FREE-AIR ANOMALY DATA IN TALPLOT FMT
C   SSW(7) = 1 FOR PRINTED INTERPOLATED DATA AND SUMMARY OF JOB
C   SSW(8) = 1 FOR PRINTING HEADING AND VALUES OF INPUT DATA
C   SSW(9) = 1 TO PUNCH INTERPOLATED ELEVATION DATA IN TALPLOT FMT
C   SSW(10) =1 TO READ GSUM DATA FROM MAGNETIC TAPE
C   SSW(11) = 1 TO WRITE INTERPOLATED DATA IN GSUM FMT ON MAGNETIC TAPE
C
C   ************************
C
C    LAST INPUT GSUM DATA CARD SHOULD HAVE  A 9 IN COLUMN 1
C
C   ************************
C
C     SETUP INPUT AND OUTPUT DEVICES
        IIN=105
       IN=105
        IIOUT=108
       IOUT=108
       IPUNCH = 106
        JTAPE=2
        ITAPE=1
        IFILE1=3
        IFILE2=4
        IFILE3=5
        DD=0.0
        OUTPUT 'PROGRAM SAINT2, VERSION OF 7 AUG 1975'
        DEGRA=1.745329E-02
        RADEG=57.29578
        INIT=ISW(-2)
C      ENTER OPTIONS FOR PRCESSIING
```

```
 5      READ(IIN,500,END=99) XKM,XSCAL,NPTS
 500    FORMAT(F5.1,F5.1,I5)
C
C    XKM = KM DISTANCE BETWEEN INTERPOLATED DATA POINTS
C    XSCAL= MAX DISTANCE FOR WHICH POINTS ARE GIVEN UNITY WEIGHT-
C         BEYOND THIS DROPS LIKE  X/XSCAL.
C
          IF(NPTS.EG.C) NPTS=4
          NDIM=2*NPTS
         WRITE(IOUT,650) KEY
 650     FORMAT(T50,'INPUT PARAMETERS'//
        A           ' SORTING KEY USED!',3(20A4/))
          OUTPUT XKM,XSCAL,NPTS
C
C      INITIALIZING FUNCTION WT
C
          I=WTSET(XSCAL)
C  READING PCS PARAMETERS AS INFUT TO SUBROUTINE PROJ
          READ(IIN,200)JA,ANG,DMAXM,ILAT,RILTM,ILONG,RILOM,JB
  20C    FORMAT(10A1,2F10.0,I4,F6.2,I4,F6.2,30A1)
          WRITE(IIOUT,200)JA,ANG,DMAXM,ILAT,RILTM,ILONG,RILOM,JB
          RILT=DMTOR(ILAT,RILTM)
          RILG=DMTOR(ILONG,RILOM)
         IF(ISW(8).EG.1)    WRITE(IOUT,604)
 604     FORMAT('0',T50,'  INPUT  CATA'//
        A' RECORD      LATITUDE  LONGITUDE  GRAVITY  FREE AIR   BOUGUER   DE
        BPTH   ELEVATION TCOR   IELC'/' NUMBER        RADIANS   RADIANS    MG
        BALS     MGALS     MGALS      MTS        MTS   ')
         CO 6 INO=1,1000
         I=INO
         IF (ISW(10).EG.0) GO TO 501
          READ (ITAPE,520,END=10)
        1 IREC,CLAT   ,DLONG   ,ELEV(I),G,DEPTH(I),FAIR(I),BOUG(I),TC,IELC
 520     FORMAT(I1,14X,2F9.4,F7.2,F9.2,F5.0,2F6.1,F4.1,I2)
         GO TO 505
 501      READ(ITAPE,502)
        1 IREC,CLAT   ,DLONG   ,ELEV(I),G,DEPTH(I),FAIR(I),BOUG(I),TC,IELC
 502     FORMAT(I1,14X,2F9.4,F7.2,F9.2,F5.0,2F6.1,F4.1,I2/)
 505     NO=INO-1
          RLAT(I)=DLAT*DEGRA
          RLONG(I)=CLONG*DEGRA
         CRV(INO)=G-977000.
         IF(IREC.EQ.9)  GO TO 10
         IF(ISW(8).EQ.1) WRITE(IOUT,605)
        A I,RLAT(I),RLONG(I),G,FAIR(I),BOUG(I),DEPTH(I),ELEV(I), TC,IELC
 605     FORMAT(' ',1X,  I5  ,4X,F9.6,2X,F9.6,1X,F9.2,2X,F6.1,4X,F6.1,3X,F6
        A.0,5X,F6.C,2X,F5.2,3X,I2)
 6       CONTINUE
 10      CONTINUE
         IREC=1
         NVAR=NO
         BSLAT=RLAT(1)
         BSLON=RLONG(1)
         T1=AMIN(RLAT,NVAR)
         T2=AMAX(RLAT,NVAR)
         T3=AMIN(RLONG,NVAR)
         T4=AMAX(RLONG,NVAR)
         CO 33 I=1,NVAR
         IF(RLAT(I).LT.BSLAT) BSLAT=RLAT(I);BSLON=RLONG(I)
 33      CONTINUE
```

```
            IF(T2-T1.GT.T4-T3) GØ TØ 34
            DØ 37 I=1,NVAR
            IF(RLØNG(I).LT.BSLØN) BSLØN=RLØNG(I);BSLAT=RLAT(I)
      37    CØNTINUE
      34    CØNTINUE
            DØ 31 I=1,NØ
             CALL DISAZ(RLAT(I),RLØNG(I),RILT,RILG,1,AZ,B,DISTKM,C)
             IF(ANG)44,44,42
         42  IF(AZ-135)48,48,46
         44  IF(AZ-225)48,48,46
         46  DISTKM=-DISTKM
         48  CØNTINUE
            DIST(I)=DISTKM *10000.0
      31    CØNTINUE
      C     ISW(1)=1 ØR GREATER SØRTS   0 ØTHERWISE
            IF(ISW(1).EQ.0)   GØ TØ 30
            DØ 11 I=1,NVAR
            G=GRV(I)+977000.
            WRITE(IFILE1,503)
           1 IREC,RLAT(I),RLØNG(I),ELEV(I),G,DEPTH(I),FAIR(I),BØUG(I),TC,IELC,
           2  DIST(I)
      503   FØRMAT(I1,14X,2F9.6,F7.2,F9.2,F5.0,2F6.1,F4.1,I2,F8.2)
      11    CØNTINUE
      C     SØRTING PART
            END FILE IFILE1
            REWIND IFILE1
            ØUTPUT ' ',' --SØRTING  TAKING  PLACE--'
            CALL CLØFIL(IFILE1)
      C
      C        IN THØRT ARGUMENT LIST
      C              2ND ARG,    4  IS UNIT NØ. FØR INFUT
      C              3RD ARG,    5  IS UNIT NØ. FØR ØUTPUT
      C
            CALL THØRT(KEY,4,5,ICØDE)
            ØUTPUT ICØDE
            CALL ØPIN(IFILE3)
            ØUTPUT '--END ØF SØRT--'
            DØ 13 I=1,NØ
            READ(IFILE3,503)
           1 IREC,RLAT(I),RLØNG(I),ELEV(I),G,DEPTH(I),FAIR(I),BØUG(I),TC,IELC,
           2  DIST(I)
            GRV(I)=G-977000.
      13    CØNTINUE
      C     CHØSE TØ PRINT AND PUNCH DATA
      C     ISW(2)=1  TØ PUNCH DATA
            IF(ISW(2).EQ.0) GØ TØ 30
            DØ 14I=1,NØ
            G=GRV(I)+977000.
             DLAT=RLAT(I)*RADEG
             DLØNG=RLØNG(I)*RADEG
            WRITE(IPUNCH,502)
           1 IREC,DLAT   ,DLØNG   ,ELEV(I),G,DEPTH(I),FAIR(I),BØUG(I),TC,IELC
      14    CØNTINUE
      30    CØNTINUE
      C      IF (ISW(3)) =1 WANT PRINTED ØUTPUT ØF SØRT
            IF(ISW(3).EQ.0) GØ TØ35
            WRITE(IØUT,602)
      602   FØRMAT('1'/ T40,'SØRTED VALUES'/
           A' RECØRD     LATITUDE LØNGITUDE GRAVITY  FREE AIR   BØUGUER   DE
           BPTH   ELEVATIØN DISTANCE KM'/' NUMBER       RADIANS   RADIANS    MG
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          BALS      MGALS      MGALS      MTS       MTS       FRØM #1')
           DØ 32   I=1,NØ
           G=GRV(I)+977000.
            ADIST=DIST(I)-10000.0
           WRITE(IØUT,603)
          A I,RLAT(I),RLØNG(I),G,FAIR(I),BØUG(I),DEPTH(I),ELEV(I),ADIST
      603  FØRMAT(' ',1X,  I5  ,4X,F9.6,2X,F9.6,1X,F9.2,2X,F6.1,4X,F6.1,3X,F6
          A.0,5X,F6.0,3X,F8.2)
      32   CØNTINUE
      C  IF ISW(4) EQ1 WILL INTERPØLATE
      35    IF(ISW(4).EQ.0) GØ TØ 50
      C   CALCULATING HEIGHT AND PLACING IT IN ELEV FIELD
            DØ 450 I=1,NØ
            IDEP=DEPTH(I)
            IF(IDEP)444,442,444
        442 HEIGT=ELEV(I)
            ELEV(I)=HEIGT
            GØ TØ 450
        444 HEIGT =-DEPTH(I)
            ELEV(I)=HEIGT
        450 CØNTINUE
           IF(ISW(7).EQ.1) WRITE(IØUT,610)
      610  FØRMAT('1'/T40,'INTERPØLATED VALUES'/
          A' RECØRD',        '          GRAVITY  FREE AIR   BØUGUER   DE
          EPTH   ELEVATIØN DISTANCE KM '/
          S                               ' NUMBER',              '       MG
          BALS      MGALS      MGALS      MTS       MTS        FRØM #1      NØRD
          * LATITUDE LØNGITUDE'        )
      C   DETERMINING NEAREST FIELD PØINT TØ FIRST MEMBER ØF DATA ARRAY
            IZERØ=(DIST(1)-10000.)/XKM
            X=10000. +IZERØ*XKM
      C     ISW(5)=1 ØUTPUT IN GSUM PUNCH
      C     ISW(6)=1 ØUTPUT IN TALPLT PUNCH
      C    ISW(7)=1  PRINTED ØUTPUT, INTERPØLATED
            NUMIT=0
            DØ 36 I=1,1000
            IF(X.GT.DIST(NØ))GØ TØ 436
       614  CØNTINUE
            CALL PICK(X,DIST,NØ,NPTS,IN,IZ)
      C  FØR USE IN ATSM AND PICK THE SØRTED ARRAY DIST MUST BE STØRED
      C               IN ØRDER FRØM THE SMALLEST TØ LARGEST (IE. DIST(I)
      C                 MUST BE < ØR = DIST(I+1)   )
            IF(ABS(DIST(IN+1)-DIST(IN)).LE.0.001) RRLØN=RLØNG(IN)/
          1  RRLAT=RLAT(IN)/ GØ TØ 644
            RRLØN=(RLØNG(IN   )*(DIST(IN+1)-X)+RLØNG(IN+1)*(X-DIST(IN)))
          1 /(DIST(IN+1)-DIST(IN))
            RRLAT=(RLAT (IN   )*(DIST(IN+1)-X)+RLAT (IN+1)*(X-DIST(IN)))
          1 /(DIST(IN+1)-DIST(IN))
        644 IN=105
            NØR=NDIM
            CALL ATSM(X,DIST(IZ),NØR,ARG,IAL,NDIM)
      C    THIS SECTIØN IS CALCULATING  THE SUM ØF THE WEIGTHS ØF THE 3 ØR 4
      C     CLØSEST VARIABLES  AND THE SUM ØF  ALL THE WEIGHTS
      C
            S3=WT(ARG(1)-X)+WT(ARG(2)-X)+WT(ARG(3)-X)
            S4=S3+WT(ARG(4)-X)
            S4E=0
            DØ 664 IK=5,NDIM
            S4E=S4E+WT(ARG(IK)-X)
       664  CØNTINUE
```

```
          S3E=S4E+WT(ARG(4)-X)
      C  WE START OUT WITH NORD (ORDER OF POLYGON) =3 . THEN IF THE FOLLOWING
      C  CONDITIONS ARE NOT MET WE REDUCE THE ORDER OF THE POLYGON
      C     THESE CONDITIONS ARE ONLY  ESTIMATES, AND SHOULD PROBABLY BE
      C  CHANGED AS FURTHER EXPERIENCE IS GAINED WITH  THE P PROGRAM
          NORD=3
          IF(S4.GT.4.*S4E) NORD=2
          IF(S3.GT.4*S3E) NORD=1
          IF((S4+S4E).LE.4) NORD=2
          IF((S4+S4E).LE.2.) NORD=1
          CALL SETAL(GRV(IZ)  ,IAL,VAL,NDIM)
          CALL EGN(X,ARG,VAL,NDIM,NORD,A)
          GG=A(1)
          CALL SETAL(FAIR (IZ),IAL,VAL,NDIM)
          CALL EGN(X,ARG,VAL,NDIM,NORD,A)
          FF=A(1)
          CALL SETAL(BOUG (IZ),IAL,VAL,NDIM)
          CALL EGN(X,ARG,VAL,NDIM,NORD,A)
          BB=A(1)
          CALL SETAL(ELEV (IZ),IAL,VAL,NDIM)
          CALL EGN(X,ARG,VAL,NDIM,NORD,A)
           EE=A(1)
          FATP(I)=FF
      C  CONVERTING ELEVATION TO KMS FOR OUTPUT AT TALPLOT ELEV INPUT
          HINT(I)=EE*0.001
         G=GG+977000.
         IF(ISW(5).EQ. 0) GO TO 705
      C   OUTPUT INTERPOLATED VALUES AT GSUM FMT ON TWO CARDS
      C                 CONVERTING TO DECIMAL DEGREES
          DRLAT=RRLAT*RADEG
          DRLON=RRLON*RADEG
         IF(ISW(11).EQ.0)GO TO 699
         WRITE(LTAPE,696)DRLAT,DRLON,EE,G,DD,FF,BB
      696 FORMAT( '1',14X,2F9.4,F7.0,F9.2,F5.0,2F6.1)
         GO TO 705
      699 WRITE(IPUNCH,700) DRLAT,DRLON,EE,G,DD,FF,BB
      700 FORMAT( '1',14X,2F9.4,F7.0,F9.2,F5.0,2F6.1  /
        1   15X,'INTERPOLATED GSUM FROM SAINT2')
      705  XD=X*10000.
      41  IF(ISW(7).EQ.1) WRITE(IOUT,611) I,G,FF,BB,DD,EE,XD,NORD,RRLAT,RRLO
         *N
      611 FORMAT(' ',1X,  I5  ,5X,               F9.1,2X,F6.1,4X,F6.1,3X,F6
         1.0,5X,F6.0,4X,F8.2,7X, I3,2F10.6)
          X=X+ XKM
          NUMIT=NUMIT+1
      36   CONTINUE
        436 CONTINUE
         IF(ISW(6).EQ.1)  WRITE(IPUNCH,615) (FATP(I),I=1,NUMIT)
        615 FORMAT(5F10.1)
          IF(ISW(9).EQ.1) WRITE(IPUNCH,620)(HINT(I),I=1,NUMIT)
        620 FORMAT(5F10.3)
      50   CONTINUE
      156  CONTINUE
           GO TO 5
      99   CONTINUE
           STOP
           END
```

```
                          HEX     DEC                               HEX     DEC                               HEX     DEC
NAME   TYPE CLASS         LØC     WØRDS    NAME   TYPE CLASS         LØC     WØRDS    NAME   TYPE CLASS         LØC     WØRDS
----   ---- -----      -------   -----     ----   ---- -----      -------   -----     ----   ---- -----      -------   -----
A         R ARRAY      00000 V      10     ABS       R SPRØG      INTRIN              ADIST     R SCALR      000D7 V       1
AMAW      R SPRØG      EXTERN              AMAXV     R ARRAY      00019 V       5     AMINV     R ARRAY      00014 V       5
AMIN      R SPRØG      EXTERN              ANG       R SCALR      000BC V       1     ARG       R ARRAY      00073 V      10
ATSP        SPRØG      EXTERN              AZ        R SCALR      000D2 V       1     B         R SCALR      000D3 V       1
BB        R SCALR      000E9 V       1     BØLG      R ARRAY      00FA0 C    1000     BSLAT     R SCALR      000CC V       1
BSLØN     R SCALR      000CD V       1     C         R SCALR      000D5 V       1     CLØFIL      SPRØG      EXTERN
DD        R SCALR      000B3 V       1     DEGRA     R SCALR      000B4 V       1     DEPTH     R ARRAY      01388 C    1000
DISAZ       SPRØG      EXTERN              DIST      R ARRAY      01B58 C    1000     DISTKM    R SCALR      000D4 V       1
DLAT      R SCALR      000C6 V       1     DLØNG     R SCALR      000C7 V       1     DMAXM     R SCALR      000BD V       1
DMTØR     R SPRØG      EXTERN              DRLAT     R SCALR      000EB V       1     DRLØN     R SCALR      000EC V       1
EE        R SCALR      000EA V       1     ELEV      R ARRAY      01770 C    1000     EPS       R SCALR      000A8 V       1
EGN         SPRØG      EXTERN              FAIR      R ARRAY      00BB8 C    1000     FATP      R ARRAY      01F40 C    1000
FF        R SCALR      000E8 V       1     G         D SCALR      000A6 V       2     GG        R SCALR      000E7 V       1
GRV       R ARRAY      007D0 C    1000     HEIGT     R SCALR      000D9 V       1     HINT      R ARRAY      02328 C    1000
I         I SCALR      000BB V       1     IAL       I ARRAY      0005F V      10     ICØDE     I SCALR      000D6 V       1
IDEP      I SCALR      000D8 V       1     IELC      I SCALR      000C9 V       1     IFILE1    I SCALR      000B0 V       1
IFILE2    I SCALR      000B1 V       1     IFILE3    I SCALR      000B2 V       1     IIN       I SCALR      000A9 V       1
IIØLT     I SCALR      000AB V       1     IK        I SCALR      000E4 V       1     ILAT      I SCALR      000BE V       1
ILØNG     I SCALR      000C0 V       1     IN        I SCALR      000AA V       1     INIT      I SCALR      000B6 V       1
INØ       I SCALR      000C4 V       1     IØUT      I SCALR      000AC V       1     IPUNCH    I SCALR      000AD V       1
IREC      I SCALR      000C5 V       1     ISW       I SPRØG      EXTERN              ITAPE     I SCALR      000AF V       1
IZ        I SCALR      000DD V       1     IZERØ     I SCALR      000DA V       1     JA        I ARRAY      0007D V      10
JB        I ARRAY      00087 V      30     JTAPE     I SCALR      000AE V       1     KEY       I ARRAY      00023 V      60
NAME      I ARRAY      0000A V       5     NDIM      I SCALR      000BA V       1     NØ        I SCALR      000CA V       1
NØR       I SCALR      000E0 V       1     NØRC      I SCALR      000E6 V       1     NP7S      I SCALR      000B9 V       1
NUMIT     I SCALR      000DC V       1     NVAR      I SCALR      000CB V       1     ØPIN        SPRØG      EXTERN
PICK        SPRØG      EXTERN              RADEG     R SCALR      000B5 V       1     RILG      R SCALR      000C3 V       1
RILØM     R SCALR      000C1 V       1     RILT      R SCALR      000C2 V       1     RILTM     R SCALR      000BF V       1
RLAT      R ARRAY      00000 C    1000     RLØNG     R ARRAY      003E8 C    1000     RRLAT     R SCALR      000DF V       1
RRLØN     R SCALR      000DE V       1     SCALE     R ARRAY      0000F V       5     SETAL       SPRØG      EXTERN
S3        R SCALR      000E1 V       1     S3E       R SCALR      000E5 V       1     S4        R SCALR      000E2 V       1
S4E       R SCALR      000E3 V       1     TC        R SCALR      000C8 V       1     THØRT       SPRØG      EXTERN
T1        R SCALR      000CE V       1     T2        R SCALR      000CF V       1     T3        R SCALR      000D0 V       1
T4        R SCALR      000D1 V       1     VAL       R ARRAY      00069 V      10     WT        R SPRØG      EXTERN
WTSET     R SPRØG      EXTERN              X         R SCALR      000DB V       1     XD        R SCALR      000ED V       1
XKM       R SCALR      000B7 V       1     XSCAL     R SCALR      000B8 V       1     Y         R ARRAY      0001E V       5

          HEX                 HEX                 HEX                 HEX                 HEX                 HEX
LABEL     LØC       LABEL     LØC       LABEL     LØC       LABEL     LØC       LABEL     LØC       LABEL     LØC
-----    -----      -----    -----      -----    -----      -----    -----      -----    -----      -----    -----
    5    0002E          6    0017A         10    0017E         11    00219         13    00272         14    0029D
   30    002A2         31    001E0         32    00318         33    001A3         34    001BD         35    0031D
   36    004E9         37    001B8         41    004BF         42    001D2         44    001D6         46    001D9
   48    001CC         50    00519         99    0051A        156    00519        200    0007F        436    004ED
  442    00329        444    0032F        450    00335        500    00037        501    0010F        502    00125
  503    0020C        505    00131        520    00102        602    002AB        603    00304        604    000AC
  605    00164        610    00343        611    004D2        614    0038E        615    00500        620    00516
  644    003BE        650    00049        664    003F8        696    00493        699    0049E        700    004A9
  705    0048C

LØCAL VARIABLES (238 WØRDS):

   00000 A          0000A NAME       0000F SCALE      00014 AMINV      00019 AMAXV      0001E Y
   00023 KEY        0005F IAL        00069 VAL        00073 ARG        0007D JA         00087 JB
  000A6 G          000A8 EPS        000A9 IIN        000AA IN         000AB IIOUT      000AC IOUT
  000AC IPUNCH     000AE WTAPE      000AF ITAPE      000B0 IFILE1     000B1 IFILE2     000B2 IFILE3
  000B3 CD         000B4 DEGRA      000B5 RADEG      000B6 INIT       000B7 XKM        000B8 XSCAL
  000B9 NPTS       000BA NDIM       000BB I          000BC ANG        000BD DMAXM      000BE ILAT
  000BF RILTM      000C0 ILONG      000C1 RILOM      000C2 RILT       000C3 RILG       000C4 INO
  000C5 IREC       000C6 DLAT       000C7 DLONG      000C8 TC         000C9 IELC       000CA NO
  000CB NVAR       000CC BSLAT      000CC BSLON      000CE T1         000CF T2         000D0 T3
  000D1 T4         000D2 AZ         000D3 B          000D4 DISTKM     000D5 C          000D6 ICODE
  000D7 ADIST      000D8 IDEP       000D9 HEIGT      000DA IZERO      000DB X          000DC NUMIT
  000DD IZ         000DE RRLON      000DF RRLAT      000EC NOR        000E1 S3         000E2 S4
  000E3 S4E        000E4 IK         000E5 S3E        000E6 NORD       000E7 GG         000E8 FF
  000E9 BB         000EA EE         000EB DRLAT      000EC DRLON      000ED XD

BLANK COMMON (10000 WORDS):

  00000 RLAT       003E8 RLONG      007D0 GRV        00BB8 FAIR       00FA0 BOUG       01388 DEPTH
  01770 ELEV       01B58 DIST       01F40 FATP       02328 HINT

INTRINSIC SUBPROGRAMS USED:

  ABS

EXTERNAL SUBPROGRAMS REQUIRED:

  AMAX      AMIN      ATSM      CLOFIL    DISAZ     DMTOR     EQN.      ISW
  OPIN      PICK      SETAL     THORT     WT        WTSET     F:101     F:102
  F:103     F:104     F:105     F:106     F:108     MIDO      MIOC      9BCDRDEE
  9BCDREAD  9BCDWRIT  9DTOR     9ENDFILE  9ENDIOL   9INITIAL  9IODATA   9IOLUSA
  9ITOR     9PRINT    9REWIND   9RTOI     9STOP

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                   DEC      HEX
                  WORDS    WORDS
                  -----    -----
 GENERATED CODE:   1308    0051C
      CONSTANTS:     24    00018
LOCAL VARIABLES:    238    000EE
          TEMPS:      5    00005
                  -----    -----
  TOTAL PROGRAM:   1575    00627   (PLUS BLANK COMMON)
```

```
C      PRØGRAM SELSP
C        VERSIØN ØF 11 AUG 75 (ØRIGINAL)
       ØUTPLT 'PRØGRAM SELSP = VERSIØN ØF 11 AUG 75'
C    FØR SELECTING SPFMT ØUTPLT ØF CRWT3 (DERIVED FRØM PRØGRAM SØRT3)
C
C PRØGRAM SØRT3,  FØR SØRTING ØUTPUT ØF CRWT2
C
        DIMENSIØN IDESC(6),VEL(8),THICK(8)
C
C           INITIALIZATIØN
C
        IIN = 105
        IIØLT = 108
       ITAPE =1; JTAPE=2
        NREC = 0
       IØREC=0
C
C      SENSE SWITCH CARD IS REGUIRED BY PINØT
C
        INIT = ISW(-2)
       KK=0
       CALL PINØT  (ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,LØNG,LØM,
      1KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,
      2STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
        ISTAØ=0
        K9 = 1H9
        NNS = 1HS
        NEW = 1HW
C
C
       READ(IIN,2) JMET,IMET,JPRØV,IPRØV,IAR,IMDP,SMIND,SMAXD
     2 FØRMAT(6I5,2F10.0)
C  IDP = INDICATØR FØR SØRT ØN WATER DEPTH ØR ELEVATIØN
C           DMIN = MINIMUM WATER DEPTH ØR ELEVATIØN
C           DMAX = MAXIMUM WATER DEPTH, ØR ELEVATIØN
       READ(IIN,3)IDP,DMIN,DMAX
     3 FØRMAT (I5,2F10.0)
       ØUTPUT JMET,IMET,JPRØV,IPRØV,IAR,IMDP,SMIND,SMAXD,IDP,DMIN,DMAX
        IF(IAR.GT.0) CALL ARLIM (IIN,IIØUT,RTØP,RBØT,RLEFT,RRIGT)
C
C  REACING U ØF TØRØNTØ WØRLD SEISMIC REFRACTIØN CØMPILATIØN
C
 10     CØNTINLE
       KK=1
       CALL PINØT  (ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,LØNG,LØM,
      1KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,
      2STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
        NREC=NREC+1
C       END-ØF-FILE ØR END-ØF-TAPE ENCØUNTERED DURING READ
       IF(KK.EG.9 ) GØ TØ 999
C  CHECKING IF KEY = 9
    18  IF(KEY-K9)20,10,20
    20  CØNTINLE
C  CHECKING FØR SØRT CHECKS
        ISTAØ=ISTA
        IF(JMET)300,310,300
   300  IF(IMET-MET)10,310,10
   310  IF(JPRØV)315,320,315
   315  NPRØV=N1*1000 + N2*100 + N3*10 + N4
```

```
      IF(IPROV-NPROV)10,320,10
  320 IF(IMDP)325,330,325
  325 IF(DINE-SMIND)10,327,327
  327 IF(SMAXD-DINE)10,330,330
  330 IF(IAR)335,360,335
  335 RLATM=LATM
      RLOM=LOM
      RLAT=DMTOR(LAT,RLATM)
      RLONG=DMTOR(LONG,RLOM)
      IF(KNS-NNS)354,352,354
  352 RLAT=-RLAT
  354 IF(KEW-NEW)358,356,358
  356 RLONG=-RLONG
  358 CALL ARCK(RLAT,RLONG,RTOP,RBOT,RLEFT,RRIGT,IND)
      IF(IND)10,360,10
  360 IF(IDP) 364,370,362
C   SEA SEISMIC PROFILE
  362 IF (N1.EQ.2) ELEV=NELEV; GO TO 366
      GO TO 10
C   LAND SEISMIC PROFILE
  364 IF(N1 .EQ. 2) GO TO 10
      ELEV=NELEV
  366 IF(ELEV-DMIN)10,368,368
  368 IF(DMAX-ELEV)10,370,370
  370 CONTINUE
C
C OUTPUT RESULTS
      KK=-2
     CALL PINOT  (ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,LONG,LOM,
    1KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,
    2STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
     IOREC=IOREC+1
     GO TO 10
  999 CONTINUE
     WRITE(IIOUT,600) NREC,IOREC
  600 FORMAT ('NUMBER OF RECORDS INPUT=',I10,
    1 'NUMBER OF RECORDS OUTPUT=',I10)
     IF (ISW(26))40,35,40
 35   END FILE JTAPE
   40 CALL EXIT
      END
```

```
                      HEX     DEC                             HEX     DEC                             HEX     DEC
NAME  TYPE CLASS      LOC     WORDS     NAME  TYPE CLASS      LOC     WORDS     NAME  TYPE CLASS      LOC     WORDS
----  ---- -----    -------   -----     ----  ---- -----    -------   -----     ----  ---- -----    -------   -----
ARCK       SPROG    EXTERN              ARLIM      SPROG    EXTERN              AVWTN    R SCALR    00032 V       1
AVWTW    R SCALR    00035 V       1     CRVW     R SCALR    00030 V       1     CRVW     R SCALR    00033 V       1
DINE     R SCALR    0002E V       1     DMAX     R SCALR    00044 V       1     DMIN     R SCALR    00043 V       1
DMTOR    R SPROG    EXTERN              ELEV     R SCALR    0004F V       1     EXIT       SPROG    EXTERN
IAR      I SCALR    0003E V       1     IDESC    I ARRAY    000C0 V       6     IDP      I SCALR    00042 V       1
IIN      I SCALR    00016 V       1     IIOUT    I SCALR    00017 V       1     IMANT    I SCALR    00026 V       1
IMDP     I SCALR    0003F V       1     IMET     I SCALR    0003B V       1     IND      I SCALR    0004E V       1
INIT     I SCALR    0001C V       1     IOREC    I SCALR    0001B V       1     IPROV    I SCALR    0003D V       1
ISTA     I SCALR    0001E V       1     ISTAB    I SCALR    00036 V       1     ISW      I SPROG    EXTERN
ITAPE    I SCALR    00018 V       1     IYR      I SCALR    0002D V       1     JMET     I SCALR    0003A V       1
JPROV    I SCALR    0003C V       1     JTAPE    I SCALR    00019 V       1     KEW      I SCALR    00025 V       1
KEY      I SCALR    0001F V       1     KK       I SCALR    0001D V       1     KNS      I SCALR    00022 V       1
K9       I SCALR    00037 V       1     LAT      I SCALR    00020 V       1     LATM     I SCALR    00021 V       1
LOM      I SCALR    00024 V       1     LONG     I SCALR    00023 V       1     MET      I SCALR    0002C V       1
NELEV    I SCALR    00027 V       1     NEW      I SCALR    00039 V       1     NNS      I SCALR    00038 V       1
NPROV    I SCALR    00049 V       1     NREC     I SCALR    0001A V       1     N1       I SCALR    00028 V       1
N2       I SCALR    00029 V       1     N3       I SCALR    0002A V       1     N4       I SCALR    0002B V       1
FINOT      SPROG    EXTERN              ROOT     R SCALR    00046 V       1     RLAT     R SCALR    0004C V       1
RLATM    R SCALR    0004A V       1     RLEFT    R SCALR    00047 V       1     RLOM     R SCALR    0004B V       1
RLONG    R SCALR    0004D V       1     RRIGT    R SCALR    00048 V       1     RTOP     R SCALR    00045 V       1
SMAXD    R SCALR    00041 V       1     SMIND    R SCALR    00040 V       1     STHIK    R SCALR    0002F V       1
THICK    R ARRAY    0000E V       8     VEL      R ARRAY    00006 V       8     WGTN     R SCALR    00031 V       1
WGTW     R SCALR    00034 V       1

         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC
-----   -----     -----    -----     -----    -----     -----    -----     -----    -----     -----    -----
    2   00056         3    00061        10    000A3        18    000C9        20    000CC        35    0016C
   40   0016E       300    000DC       310    000D3       315    000D5       320    000E4       325    000E6
  327   000E9       330    000EC       335    000EE       352    00101       354    00104       356    00107
  358   0010A       360    00115       362    00118       364    00120       366    00126       368    00129
  370   0012C       600    00156       999    00150

LOCAL VARIABLES (8C WORDS):

   0000C IDESC     00006 VEL       0000E THICK     00016 IIN       00017 IIOUT     00018 ITAPE
   00019 JTAPE     0001A NREC      0001B IOREC     0001C INIT      0001D KK        0001E ISTA
   0001F KEY       00020 LAT       00021 LATM      00022 KNS       00023 LONG      00024 LOM
   00025 KEW       00026 IMANT     00027 NELEV     00028 N1        00029 N2        0002A N3
   0002B N4        0002C MET       0002D IYR       0002E DINE      0002F STHIK     00030 CRVN
   00031 WGTN      00032 AVWTN     00033 CRVW      00034 WGTW      00035 AVWTW     00036 ISTAB
   00037 K9        00038 NNS       00039 NEW       0003A JMET      0003B IMET      0003C JPROV
   0003D IPROV     0003E IAR       0003F IMDP      0004C SMIND     00041 SMAXD     00042 IDP
   00043 DMIN      00044 DMAX      00045 RTOP      00046 ROOT      00047 RLEFT     00048 RRIGT
   00049 NPROV     0004A RLATM     0004B RLOM      0004C RLAT      0004D RLONG     0004E IND
   0004F ELEV

BLANK COMMON (0 WORDS)

EXTERNAL SUBPROGRAMS REQUIRED:

   ARCK      ARLIM     DMTOR     EXIT      ISW       FINOT     F:101     F:102
   F:1C3     F:1C4     F:1C5     F:106     F:108     M:D0      M:8C      9BCDREAD
  SØCCWRIT   $ENDFILE   $ENDIØL    $INITIAL   $IØDATA    $ITØR      $PRINT     $STØP

HIGHEST ERRØR SEVERITY: C (NØ ERRØRS)

                      DEC       HEX
                     WØRDS     WØRDS
                     -----     -----
   GENERATED CØDE:    370      00172
        CØNSTANTS:      5      00005
  LØCAL VARIABLES:     80      00050
            TEMPS:      2      00002
                     -----     -----
    TØTAL PRØGRAM:    457      001C9
```

COMPILED 20 MAR 73

```
C       PRØGRAM SPFMT
C
C      VERSIØN ØF 21 AUGUST 1971,  TØ READ NEW CARD SET REC'D JULY 71
        DIMENSIØN IDESC(6),VEL(8),THICK(8),X(8)
        DIMENSIØN JDESC(6)
C
C  PRØGRAM SPFMT, CØNVERTS SEISMIC REFRACTIØN CØLUMN FØRMAT
C        FRØM U ØF TØRØNTØ WØRLD SEISMIC REFRACTIØN CØMPILATIØN
C
C  FØRMAT TØ SPFMT FØRMAT
C  EACH PRØFILE IN ØNE 120 CHARACTER RECØRD
C
C       USES SUBRØUTINES ISW, STAT, EVIL
C
C
C   *********************************************************
C  ITAPE = URN FØR SEISMIC DATA INPUT
C       JTAPE = URN FØR SPFMT DATA ØUTPUT
        ITAPE = 1
        JTAPE = 2
C   *********************************************************
C
C
C
C    *****************   NØTE   *****************
C
C        IN ØRDER TØ ØUTPUT THE LAST DATA CARD,  A BLANK CARD MUST
C             FØLLØW THE DATA CARDS.
C
C    ***************************************************
C
        IIN = 105
        IIØUT = 108
        CALL STAT
        INN = ISW(-2)
        WRITE (IIØUT,605)
  605   FØRMAT ( / 'PRØGRAM  SPFMT' //)
        ØUTPUT '  VERSIØN ØF 21 AUGUST 1971'
        ISTAØ=0
        RND=0.5
        NREC=0
        IFST=0
C
C  L9 = 9
C  LC = 0
C  L3 = 3
C  L4 = 4
C  KNUM = *
C
        L9 = 1H9
        L0 = 1H0
        L3 = 1H3
        L4 = 1H4
        KNUM = 1H#
        L2=1H2
        L6=1H6
        L8=1H8
        LK=1HK
        LM=1HM
        LP=1HP
        LR=1HR
        LT=1HT
        LV=1HV
        LX=1HX
        LZ=1HZ
        LQ=1H
        IREC1=1
        DINE = 0.0
        STHIK=0.0
        CRVN = 0.0
        WGTN = 0.0
        AVWTN = 0.0
        CRVW = 0.0
        WGTW = 0.0
        AVWTW = 0.0
C
C
        KDA= 0
        KMØ= 0
        KYR= 0
C  READING U ØF TØRØNTØ WØRLD SEISMIC REFRACTIØN CØMPILATIØN
 999    CØNTINUE
         READ(ITAPE,12)JISTA,JKEY,JLAT,JLATM,JKNS,JLØNG,JLØM,
     1    JKEW,V1,T1,V2,T2,V3,T3,V4,T4,VMATJ,ELEVJ,
     2    JN1,JN2,JN3,JN4,JMET,JIYR,JDESC
   12   FØRMAT(I4,A1,I2,I2,A1,I3,I2,A1,4(F2.1,F3.1),
     1  F2.1,17X,F4.2,4I1,I1,I2,6A2)
        CALL STAT(I)
        CALL EVIL(IIØUT,I,IBAD,KDA,KMØ,KYR,JISTA)
        IF (IBAD) 999,13, 995
   13   CØNTINUE
C
C  CHECKING FØR KEY CØDE FØR SECØND CARD
C
        IF(JKEY-L2)501,550,501
  501   IF(JKEY-L6)502,550,502
  502   IF(JKEY-L8)503,550,503
  503   IF(JKEY-LK)504,550,504
  504   IF(JKEY-LM)505,550,505
  505   IF(JKEY-LP)506,550,506
  506   IF(JKEY-LR)507,550,507
  507   IF(JKEY-LT)508,550,508
  508   IF(JKEY-LT)509,550,509
  509   IF(JKEY-LV)510,550,510
  510   IF(JKEY-LX)511,550,511
  511 IF(JKEY-LZ)512,550,512
  512 IF(JKEY-LQ)513,550,513
  513  GØ TØ 301
  550  IF(JISTA-ISTAØ)444,555,444
  444  ISTAØ=0
       GØ TØ 999
  555  CØNTINUE
C
C  CØNVERT READ VALUES TØ THØSE FØR LAYERS 5 - 8
C
       VEL(5) = V1
       VEL(6) = V2
       VEL(7) = V3
       VEL(8) = V4
       THICK(5) = T1
       THICK(6) = T2
       THICK(7) = T3
       THICK(8) = T4
C    TAKING INFØ FRØM SECØND CARD FØR ØUTPUT
       KEY=JKEY
       LAT=JLAT
       LATM=JLATM
       KNS=JKNS
       LØNG=JLØNG
       LØM=JLØM
       KEW=JKEW
       VMANT=VMATJ
       IMANT = VMANT*10.0
       ELEV=ELEVJ
       NELEV = ELEV * 100.0 +(SIGN(RND,ELEV))
       N1=JN1
       N2=JN2
       N3=JN3
       N4=JN4
       MET=JMET
       IYR=JIYR
      DØ 560 I = 1,6
       IDESC(I)=JDESC(I)
  560  CØNTINUE
C           SETTING INDICATØR FØR PRØCESS CØNTRØL AFTER ØUTPUT
       IND=2
       IFST=0
  600  CØNTINUE
   85  J1 = VEL(1)     *10.0  + 0.5
       J2 = VEL(2)     *10.0  + 0.5
       J3 = VEL(3)     *10.0  + 0.5
       J4 = VEL(4)     *10.0  + 0.5
       J5 = VEL(5)     *10.0  + 0.5
       J6 = VEL(6)     *10.0  + 0.5
       J7 = VEL(7)     *10.0  + 0.5
       J8 = VEL(8)     *10.0  + 0.5
       K1 = THICK(1)   *10.0  + 0.5
       K2 = THICK(2)   *10.0  + 0.5
```

```
            K3 = THICK(3)   *10.0  + 0.5
            K4 = THICK(4)   *10.0  + 0.5
            K5 = THICK(5)   *10.0  + 0.5
            K6 = THICK(6)   *10.0  + 0.5
            K7 = THICK(7)   *10.0  + 0.5
            K8 = THICK(8)   *10.0  + 0.5
            WRITE(JTAPE,990)IREC1,ISTA,KEY,LAT,LATM,KNS,LONG,LOM,
          1  KEW,J1,K1,J2,K2,J3,K3,J4,K4,J5,K5,J6,K6,J7,K7,J8,K8,
          2  IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,STHIK,CRVN
          3  WGTN,AVWTN,CRVW,WGTW,AVWTW
      990   FORMAT(I1,I4,A1,I2,I2,A1,I3,I2,A1,8(I2,I3),I2,I4,4I1,
          1    I1,I2,6A2,2F4.1,F3.1,2F6.0,1X,F3.1,2F6.0,5X)
            NREC=NREC+1
    C   SETTING VELOCITY AND THICKNESS ARRAYS = ZERO
            DO 602 I =1,8
            VEL(I) = 0.0
            THICK(I) = 0.0
      602   CONTINUE
            GO TO (330,610)IND
      610   ISTAO=0
            GO TO 999
      301   IF(JKEY-L9)310,305,310
      305   IF(V1-0.01)999,999,310
      310   IF(IFST)312,320,312
      312   IND=1
            GO TO  600
      320   IFST=1
      330   CONTINUE
    C
    C   CONVERT READ VALUES TO  TO THOSE FOR LAYERS 1 - 4
    C
             ISTA=JISTA
            KEY=JKEY
            LAT=JLAT
            LATM=JLATM
            KNS=JKNS
            LONG=JLONG
            LOM=JLOM
            KEW=JKEW
            VMANT=VMATJ
            IMANT = VMANT*10.0
            ELEV=ELEVJ
            NELEV = ELEV * 100.0 +(SIGN(RND,ELEV))
            N1=JN1
            N2=JN2
            N3=JN3
            N4=JN4
            MET=JMET
            IYR=JIYR
           DO 340 I = 1,6
            IDESC(I)=JDESC(I)
      340   CONTINUE
       22   VEL(1) = V1
      VEL(2) = V2
      VEL(3) = V3
      VEL(4) = V4
      THICK(1) = T1
      THICK(2) = T2
      THICK(3) = T3
      THICK(4) = T4
      ISTAØ=JISTA
C   READ NEW INPUT CARD
      GØ TØ 999
  995 END FILE JTAPE
      WRITE(IIØUT,996)NREC
  996 FØRMAT('EØF FØUND,  NREC =  ', I8)
      CALL EXIT
      END
```

```
                           HEX     DEC                                HEX     DEC                                HEX     DEC
NAME   TYPE CLASS          L3C     WØRDS   NAME   TYPE CLASS          LØC     WØRDS   NAME   TYPE CLASS          LØC     WØRDS
----   ---- -----        -------   -----   ----   ---- -----        -------   -----   ----   ---- -----        -------   -----
AVWTN     R SCALR        00043 V       1   AVWTW     R SCALR        00046 V       1   CRVN      R SCALR        00041 V       1
CRVW      R SCALR        00044 V       1   DINE      R SCALR        0003F V       1   ELEV      R SCALR        0006D V       1
ELEVJ     R SCALR        0005B V       1   EVIL        SPRØG        EXTERN            EXIT        SPRØG        EXTERN
I         I SCALR        00062 V       1   IBAC      I SCALR        00063 V       1   IDESC     I ARRAY        00000 V       6
IFST      I SCALR        0002C V       1   IIN       I SCALR        00026 V       1   IIØUT     I SCALR        00027 V       1
IMANT     I SCALR        0006C V       1   IND       I SCALR        00075 V       1   INN       I SCALR        00028 V       1
IREC1     I SCALR        0003E V       1   ISTA      I SCALR        00086 V       1   ISTAØ     I SCALR        00029 V       1
ISW       I SPRØG        EXTERN            ITAPE     I SCALR        00024 V       1   IYR       I SCALR        00074 V       1
JDESC       ARRAY        0001E V       6   JISTA     I SCALR        0004A V       1   JIYR      I SCALR        00061 V       1
JKEW      I SCALR        00051 V       1   JKEY      I SCALR        0004B V       1   JKNS      I SCALR        0004E V       1
JLAT      I SCALR        0004C V       1   JLATM     I SCALR        0004D V       1   JLØM      I SCALR        00050 V       1
JLØNG     I SCALR        0004F V       1   JMET      I SCALR        00060 V       1   JN1       I SCALR        0005C V       1
JN2       I SCALR        0005D V       1   JN3       I SCALR        0005E V       1   JN4       I SCALR        0005F V       1
JTAPE     I SCALR        00025 V       1   J1        I SCALR        00076 V       1   J2        I SCALR        00077 V       1
J3        I SCALR        00078 V       1   J4        I SCALR        00079 V       1   J5        I SCALR        0007A V       1
J6        I SCALR        0007B V       1   J7        I SCALR        0007C V       1   J8        I SCALR        0007D V       1
KDA       I SCALR        00047 V       1   KEW       I SCALR        0006A V       1   KEY       I SCALR        00064 V       1
KMØ       I SCALR        00048 V       1   KNS       I SCALR        00067 V       1   KNUM      I SCALR        00031 V       1
KYR       I SCALR        00049 V       1   K1        I SCALR        0007E V       1   K2        I SCALR        0007F V       1
K3        I SCALR        00080 V       1   K4        I SCALR        00081 V       1   K5        I SCALR        00082 V       1
K6        I SCALR        00083 V       1   K7        I SCALR        00084 V       1   K8        I SCALR        00085 V       1
LAT       I SCALR        00065 V       1   LATM      I SCALR        00066 V       1   LK        I SCALR        00035 V       1
LM        I SCALR        00036 V       1   LØM       I SCALR        00069 V       1   LØNG      I SCALR        00068 V       1
LP        I SCALR        00037 V       1   LQ        I SCALR        0003D V       1   LR        I SCALR        00038 V       1
LT        I SCALR        00039 V       1   LV        I SCALR        0003A V       1   LX        I SCALR        0003B V       1
LZ        I SCALR        0003C V       1   L0        I SCALR        0002E V       1   L2        I SCALR        00032 V       1
L3        I SCALR        0002F V       1   L4        I SCALR        00030 V       1   L6        I SCALR        00033 V       1
L8        I SCALR        00034 V       1   L9        I SCALR        0002D V       1   MET       I SCALR        00073 V       1
NELEV     I SCALR        0006E V       1   NREC      I SCALR        0002B V       1   N1        I SCALR        0006F V       1
N2        I SCALR        00070 V       1   N3        I SCALR        00071 V       1   N4        I SCALR        00072 V       1
RND       R SCALR        0002A V       1   SIGN      R SPRØG        INTRIN            STAT        SPRØG        EXTERN
STHIK     R SCALR        00040 V       1   THICK     R ARRAY        0000E V       8   T1        R SCALR        00053 V       1
T2        R SCALR        00055 V       1   T3        R SCALR        00057 V       1   T4        R SCALR        00059 V       1
VEL       R ARRAY        00006 V       8   VMANT     R SCALR        0006B V       1   VMATJ     R SCALR        0005A V       1
V1        R SCALR        00052 V       1   V2        R SCALR        00054 V       1   V3        R SCALR        00056 V       1
V4        R SCALR        00058 V       1   WGTN      R SCALR        00042 V       1   WGTW      R SCALR        00045 V       1
X         R ARRAY        00016 V       8

        HEX             HEX             HEX             HEX             HEX             HEX
LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC
-----   -----   -----   -----   -----   -----   -----   -----   -----   -----   -----   -----
   12   00087      13   000A8      22   0020C      85   0011D     301   001CA     305   001CD
  310   001D0     312   001D2     320   001D5     330   001D7     340   0020A     444   000D3
  501   000AB     502   000AE     503   000B1     504   000B4     505   000B7     506   000BA
  507   000BD     508   000C0     509   000C3     510   000C6     511   000C9     512   000CC
  513   000CF     550   000D0     555   000D6     560   00117     600   0011D     602   001BE
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AD-A035 454 WHOI-77-2 FEB 77

GRAVITY DATA PROCESSING PROGRAMS.(U)

CARL BOWIN

UNCLASSIFIED WOODS HOLE OCEANOGRAPHIC INSTITUTION, MA

4 OF 6
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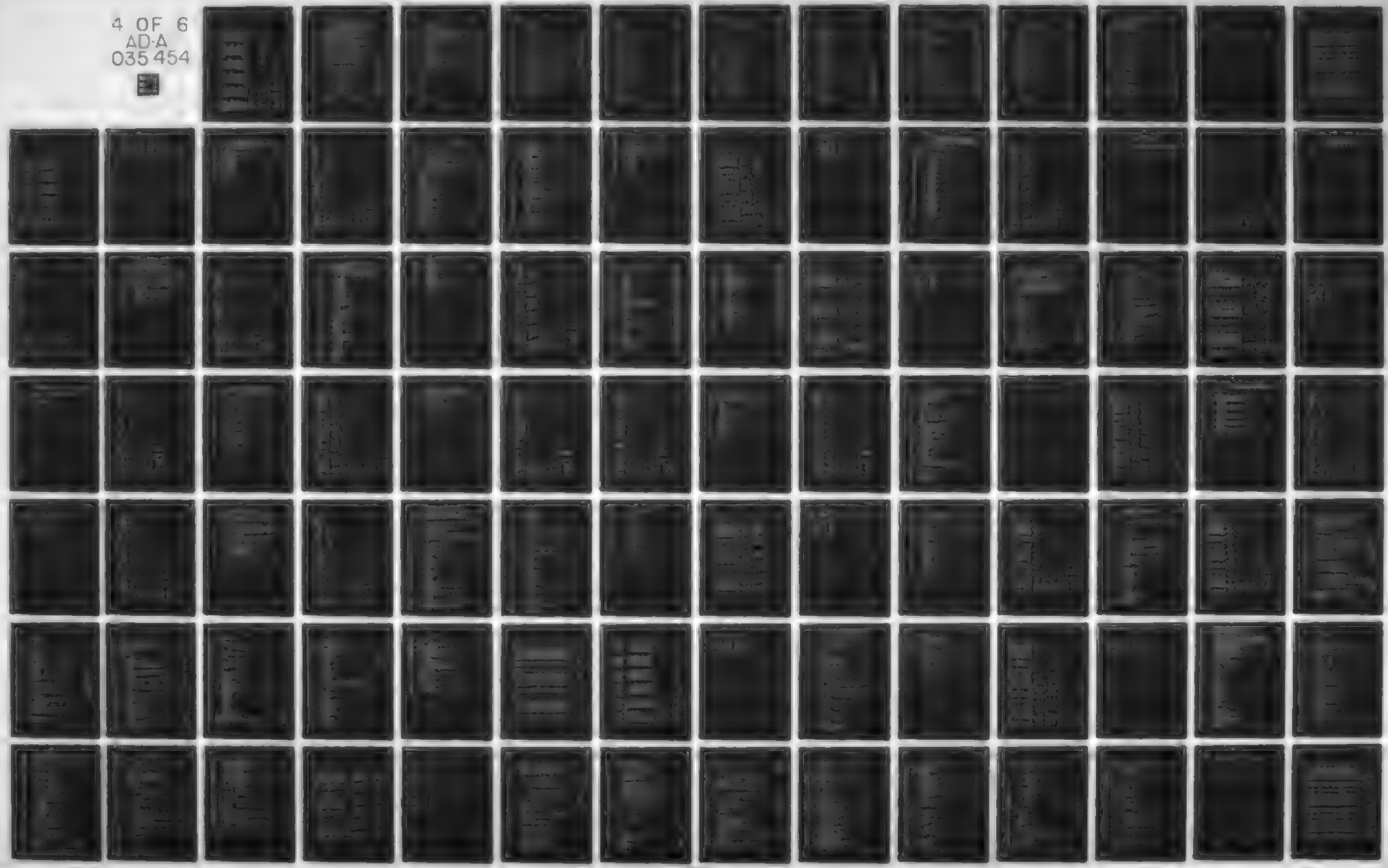

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LOCAL VARIABLES (135 WORDS):

   00000 IDESC     00006 VEL       0000CE THICK    00016 X         0001E JDESC     00024 ITAPE
   00025 JTAPE     00026 IIN       00027 IIOUT     00028 INN       00029 ISTAB     0002A RND
   0002B NREC      0002C IFST      0002D L9        0002E LO        0002F L3        00030 L4
   00031 KNUM      00032 L2        00033 L6        00034 L8        00035 LK        00036 LM
   00037 LP        00038 LR        00039 LT        0003A LV        0003B LX        0003C LZ
   0003D LQ        0003E IREC1     0003F DINE      00040 STHIK     00041 CRVN      00042 WGTN
   00043 AVWTN     00044 CRVW      00045 WGTW      00046 AVWTW     00047 KDA       00048 KMO
   00049 KYR       0004A JISTA     0004B JKEY      0004C JLAT      0004D JLATM     0004E JKNS
   0004F JLONG     00050 JLOM      00051 JKEW      00052 V1        00053 T1        00054 V2
   00055 T2        00056 V3        00057 T3        00058 V4        00059 T4        0005A VMATJ
   0005B ELEVJ     0005C JN1       0005D JN2       0005E JN3       0005F JN4       00060 JMET
   00061 JIYR      00062 I         00063 IBAD      00064 KEY       00065 LAT       00066 LATM
   00067 KNS       00068 LONG      00069 LOM       0006A KEW       0006B VMANT     0006C IMANT
   0006D ELEV      0006E NELEV     0006F N1        00070 N2        00071 N3        00072 N4
   00073 MET       00074 IYR       00075 IND       00076 J1        00077 J2        00078 J3
   00079 J4        0007A J5        0007B J6        0007C J7        0007D J8        0007E K1
   0007F K2        00080 K3        00081 K4        00082 K5        00083 K6        00084 K7
   00085 K8        00086 ISTA

BLANK COMMON (0 WORDS)

INTRINSIC SUBPROGRAMS USED:

   SIGN

EXTERNAL SUBPROGRAMS REQUIRED:

   EVIL       EXIT       ISW        STAT       F:101      F:102      F:103      F:104
   F:105      F:106      F:108      M:D8       M:8C       9BCDREAD   9BCDWRIT   9ENDFILE
   9ENDIOL    9INITIAL   9IODATA    9IOLUSA    9PRINT     9RTOI      9STOP

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                    DEC      HEX
                   WORDS    WORDS
                   -----    -----
  GENERATED CODE:    562    00232   (NO MEMORY PROTECTION)
       CONSTANTS:     22    00016
 LOCAL VARIABLES:    135    00087
           TEMPS:      1    00001
                   -----    -----
  TOTAL PROGRAM:     720    002D0
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COMPILED 24 April 1975

```
C       PROGRAM TALPLOT 16
          OUTPUT ' TALPLOT 16 RUN,  VERSION OF 8 APRIL 75'
C       VERSION 8 APRIL 75 TO ZERO  VARIABLES
C         VERSION OF 25 MAY 1973, CHANGING TALPLOT 15 TO 16 AND
C               CORRECTING ERROR IN 2D BOUGUER ANOMALY (BGTD) CALCULATION
C               BGTD VALUES WERE ONLY CORRECT IN PAST WHEN RDENS EQUALLED
C               THE VALUE 2.67.
C VERSION OF NOV15 TO CORRECT OUPUT ON JTAPE OF  NEW FIELD POINTS
C SO THAT PLOTTING PROGRAM TERMINATES CORRECTLY
C  MOD OCT 14 TO CORRECT WEIGT BUG AND TO REMOVE PUNCHING OF
C    MODIFIED POINTS.  TIMER FEATURE ADDED
C       VERSION OF SEPT 28 CORRECTED WT CALCULATION FOR ELEVATION
C   AND IMPLEMENTED FILTERING OF RESIDUALS
C  MODIFIED SEPT 14,1971 BY FOLINSBEE
C     AND TO FILTER THE RESIDUAL BETWEEN OBSERVED AND THEORETICAL GRAVITY
C  MOD OF JUNE 9,1971  COMENST ON POLYGON CARDS,CORRECT WT CALC.
C   MODIFIED JUNE 2 71 TO USE ELEVATIONS IN CRUSTAL WT CALCULATION
C   VERSION OF 5 APRIL 1971, WRITES COMPLETE BOUGUER ON JTAPE
C LAST CHANGE FEB 3 71 TO READING OF ELEVATIONS
C     C LAST CHANGE JAN 19 71 TO REMOVE  OGGA BUG
C   LAST CHANGE(REMOVE OGA SET TO 0. BUG) ON JAN 14,71 AFOLINSBEE
C  TALPLOT 15 FROM TALPLOT 14 ON OCT 23,1970 BY AFOLINSBEE               TAU00000
C    THIS IS A PROGRAM TO SO BOTH LAND AND SEA DATA                      TAU00010
C   ELEVATION MUST FOLLOW OGA DAT , BEGINNING WITH A NEW CARD IN FORMAT TAU00040
C       5F10.2                                                          TAU00050
C           FOR USE ON SIGMA 7,   7 TRACK MAGNETIC TAPE                 TAU00060
C             OUTPUT REPRODUCES INPUT AND ALSO RESULTS                  TAU00070
C                                                                       TAU00080
C    ASSIGN 9 TRACK MAG TAPE TO UNIT NUMBER 2                           TAU00090
C LAST BODY POINT IN EACH POLYGON MUST HAVE A 9 IN COL 21               TAU00100
C   WEIGH EXPECTS THE DIMENSION OF X,Z, TO BO BE 3 .GT. THE #OF POLY    TAU00110
C     POINTS                                                            TAU00120
C                                                                       TAU00130
C               LNO=1  SHOULD BE FOR WATER LAYER ONLY                   TAU00140
C               IF LNO=1, THEN  2-D BOUGUER ANOMALY IS CALULATED.       TAU00150
C               REFERENCE DENSITY AND WEIGHT INPUTS REQUIRED.           TAU00160
C       THE WEIGHT IS CACULATED FOR THE INPUT POLYGONS, Z AND NOT       TAU00170
C     FOR THE MODIFIED POLYGONS                                         TAU00180
C                                                                       TAU00190
C         ISW(1)=0    WRITE JTAPE                                       TAU00200
C               =1  NO WRITE JTAPE                                      TAU00210
C                                                                       TAU00220
C         ISW(2)=0  SETS ELEV      =0                                   TAU00230
C               = 1   READS IN ELEV   IN   KM
C               =2    READS IN ELEV   IN   METERS
C                                                                       TAU00250
C         ISW(3)=0       PRONTS INTERMEDIATE DATA FOR EACH PLOYGON      TAU00260
C               =1    NO PRITOUT OF INTERMED DATA                       TAU00270
C                                                                       TAU00280
C         ISW(4)=0    PLOT INTERMEDIATE DATA                            TAU00290
C               =1     NO PLOT                                          TAU00300
C                                                                       TAU00310
C         ISW(5)=0   NO PLOT OF ELEVATION                               TAU00320
C               =1    PLOT ELEVATION                                    TAU00330
C       ISW(6) =1  TO ADJUST LAST CURVE TO FIT GRAVITY DATA             TAU00340
C     SSW(7) UP FOR OUTPUT DURING DEBUGING ONLY
C                                                                       TAU00370
C       ISW(9)  =1 TO NOT WRITE INTERMEDIATE DATA FOR EACH POLYGON ONTO TAU00380
C       JTAPE                                                           TAU00390
```

```
C
C   SSW(11) UP TØ NØT USES ELEVATIØN VALUES IN THE CALCULATIØN
C     ØF THEØRETICAL GRAVITY
C     IF SSW(11) IS UP THEN THE GRAVITY VALUES READ IN SHØULD
C     BE CØMPLETE BØUGUER ANØMALIES
C   IALTE =1 MEANS THAT THIS PØINT WILL BE VARRIED TØ CØMPUTE A BEST FITTAU00400
C     SSW(12) UP TØ USE ELEVATIØN VALUES IN CRUSTAL WT CALCULATIØN
C    THIS SHØULD BE USED WHEN THE GRAVITY ANØMALIES ARE BØUGUER ANØMALIES
C       AND THUS THE TØP ØF THE MØDEL IS AT SEA LEVEL.  A DENSITY ØF  2.67
C     IS USED IN  AKING THE WT CØRRECTIØN
C    SSW(13) =1 TØ ØUTPUT RESULTS ØF INPUT PØLYGØNS BEFØRE
C     ALTERING THE VARIABLE BØUNDARY PØINTS
C      THE PØLYGØN THAT IS TØ BE VARRIED MUST BE THE LAST PØLYGØN TØ BE TAU00410
C    THE PØINT TØ BE VARRIED MUST NØT BE THE FIRST ØR LAST PØINT IN THE TAU00420
C      PØLYGØN                                                          TAU00430
C    IMAX IS THE MAXIMUM NUMBER ØF MØDELS THAT WILL BE CZLCULATED       TAU00440
C   IMØD IS THE NUMBERR ØF MØDELS THAT HAVE BEEN CALCULATED             TAU00450
C                                                                       TAU00460
      LØGICAL BAR/.FALSE./                                              TAU00470
      CØMMØN FER(200),WFER(-10:10)
      DIMENSIØN LABEL(20)                                               TAU00480
      DIMENSIØN CØME(5)
      DIMENSIØN FX(200),FZ(200)                                         TAU00490
      DIMENSIØN PDELZ(200),SSELZ(200),XO(1),X(200),ZO(1),Z(200),        TAU00500
     1  BGA(200),RESA(200),TEST(200),         DSU(200)                  TAU00510
      DIMENSIØN ARRAY (200,5),SUM(200),DWGT(200),PCØN(200),SUMW(200)    TAU00520
      DIMENSIØN RFDEL(20) ,XS(20)                                       TAU00530
      DIMENSIØN IALTE(150),AA(20,21),KK(5),D(5) ,DDELZ(20)              TAU00540
      DIMENSIØN BGGA(200)
      DIMENSIØN STSUM(200)
     EQUIVALENCE(ARRAY(1,1),FX(1)),(ARRAY(1,2),SSELZ(1)),               TAU00550
    1 (ARRAY(1,3),RESA(1)),(ARRAY(1,4),BGGA(1))
  100 FØRMAT(5F5.1)                                                     TAU00570
      CALL TIC
      DØ 1 K=1,200
    1 FER(K)=0.
      ILØØP=0                                                           TAU00580
      SREFC=0                                                           TAU00590
      IREST=0
      IFIRST=0
      RSQ=1.E70                                                         TAU00600
      IMØD=0                                                            TAU00610
      DEL=.15                                                           TAU00620
      D(2)=-DEL                                                         TAU00630
      D(4)=DEL                                                          TAU00640
      KK(1)=-1                                                          TAU00650
      KK(3)=1                                                           TAU00660
      KK(5)=-1                                                          TAU00670
      MCH=0
      D(1)=0.0
      D(3)=0.0
      D(5)=0.0
      KK(2)=0
      KK(4)=0
      DØ 101 I=1,200
      RESA(I)=0.0
      FX(I)=0.0
      FZ(I)=0.0
      PDELZ(I)=0.0
      SSELZ(I)=0.0
```

```
          X(I)=0.0
          Z(I)=0.0
          SUM(I)=0.0
          DWGT(I)=0.0
          RCBX(I)=0.0
          SUMX(I)=0.0
          STSUM(I)=0.0
      101 CØNTINUE
          DØ 102 I=1,20
          XS(I)=0.0
          REDEL(I)=0.0
      102 CØNTINUE
           II =105                                                      TAU00680
           IPUN=106                                                     TAU00690
          IIØUT=108                                                     TAU00700
           IU=4                                                         TAU00710
          JTAPE=2                                                       TAU00720
           KFXN=1                                                       TAU00730
C    NØTE THAT THE LAST PØLYGØN MUST HAVE NUMBER 99                     TAU00740
           L=99                                                         TAU00750
  42   FØRMAT(2F10.2)                                                   TAU00760
  442  FØRMAT(2F10.2,2I1)                                               TAU00770
    44 FØRMAT(I5,4F10.2)                                                TAU00780
    45 FØRMAT(//6H LNØ =,I4,         10H     RHØ =,F10.3,2X,5A4)
    47 FØRMAT(/35H     K      FX(K)      FZ(K)    ANØMALY)              TAU00800
    51 FØRMAT(/  '     K      FX(K)      FZ(K)    ANØMALY   CAL REF  RESIDUALTAU00810
    *11   ØBS ANØMALY          WEIGHT        WGT DIFF     WEIGHTEST',5X,'FILT')
C       RDENS =REFERENCE DENSITY FØR GRAVITY CALCULATIØNS               TAU00830
C   RWGT = REFERENCE WEIGHT FØR MASS CALCULATIØNS                       TAU00840
C         RHØD=DIFFERENCE DENSITY FØR MØDEL ADJUSTING =RHØ LØWER)-RHØ(UPPERTAU00850
          READ(IIN,446) (LABEL(KU),KU=1,20)                             TAU00860
      446     FØRMAT(20A4)                                              TAU00870
          WRITE(IIØUT,447) (LABEL(KU),KU=1,20)                          TAU00880
      447     FØRMAT(1X,20A4)                                           TAU00890
          I=ISW(-2)                                                     TAU00910
          IF(ISW(1).EQ.0) WRITE(JTAPE,446) (LABEL(KU),KU=1,20)          TAU00920
          DØ 56 K=1,80                                                  TAU00920
      56      IALTE(K)=ISW(K)                                           TAU00930
          IF(ISW(1).EQ.0) WRITE(JTAPE,419) (IALTE(K),K=1,80)            TAU00940
      419     FØRMAT(80I1)                                              TAU00950
          READ (IIN,427) RDENS,RWGT,RHØD,REFX,FXI,DELFX,M,NFER,IMAX     TAU00960
      427     FØRMAT(6E10.2, I10,2I5)
          ØUTPUT RDENS,RWGT,RHØD,REFX,FXI,DELFX,M,NFER,IMAX             TAU00980
          IZERØ=0
          IF(ISW(1).EQ.0) WRITE(JTAPE,427) RDENS,RWGT,RHØD,REFX,FXI,DELFX,MTAU00990
         *,IZERØ,IMAX
          IF(NFER.LT.1) GØ TØ 5963
          ØUTPUT 'WFER(K)     '
          DØ 5960 K=0,NFER
          WFER(K)=(NFER-K+1.)/(NFER+1.)
          WFER(-K)=WFER(K)
          KL=-K
          WRITE(IIØUT,42) WFER(KL),WFER(K)
C         NØTE WE HAVE MADE A TRIANGULAR WEIGHTING FUNCTIØN
      5960    CØNTINUE
      5963    CØNTINUE
          DØ 59 I=1,M                                                   TAU01010
          SUM(I)=0.                                                     TAU01020
          TEST(I)=0                                                     TAU01030
          DSU(I)=0                                                      TAU01040
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       59 CØNTINUE                                                      TAU01050
          FX(KFXN)=FXI                                                  TAU01060
          FZ(KFXN)=0.0                                                  TAU01070
          ARRAY(KFXN,5)=0.                                              TAU01080
          K1=KFXN+1                                                     TAU01090
          READ200,(ØGA(I),I=1,M)                                        TAU01100
   200     FØRMAT(5F10.1)                                               TAU01110
           DØ 620 I=1,M
           ØGGA(I)=ØGA(I)
           IF(ØGA(I).GE.899.) ØGGA(I)=0.
   620     CØNTINUE
          IF(ISW(1).EQ.1) GØ TØ 7004                                    TAU01120
          WRITE (JTAPE,200) (ØGA(I),I=1,M)                              TAU01130
   7004    CØNTINUE
           IF (ISW(2).EQ.0) GØ TØ 7021
           READ201,(FZ(I),I=1,M)                                        TAU01160
   201     FØRMAT(5F10.1)                                               TAU01170
          IF(ISW(1).EQ.1) GØ TØ 7005                                    TAU01180
          WRITE(JTAPE,  201) (FZ(I),I=1,M)                              TAU01190
     7005 CØNTINUE                                                      TAU01200
           CC= 1.
           IF(ISW(2).EQ.2) CC=1000.
          DØ 7034 I=1,M                                                 TAU01210
           FZ(I)=-FZ(I)/CC
          ARRAY(I,5)=FZ(I)*(-100.)                                      TAU01230
           IF(ISW(11).EQ.1) FZ(I)=0.
   7034   CØNTINUE                                                      TAU01240
     7021 CØNTINUE                                                      TAU01250
          DØ 451 K=K1,M                                                 TAU01260
          FX(K)=FX(K-1)+DELFX                                           TAU01270
     4501  CØNTINUE                                                     TAU01280
      451 CØNTINUE                                                      TAU01290
          DØ 96 K=KFXN,M                                                TAU01300
          SSELZ(K) = 0.0                                                TAU01310
       96 CØNTINUE                                                      TAU01320
          DØ 53J=KFXN,M                                                 TAU01330
          IF(REFX-FX(J))53,21,53                                        TAU01340
       53 CØNTINUE                                                      TAU01350
       21 J=J                                                           TAU01360
          REFØGA = ØGA(J)                                               TAU01370
           JREF=J                                                       TAU01380
   60      CØNTINUE                                                     TAU01390
           READ(IIN,433) LNØ,RHØRK,CØME
   433     FØRMAT(I5,F10.3,5A4)
           WRITE(IIØUT,45) LNØ,RHØRK,CØME
           IF(ISW(1).EQ.0) WRITE(JTAPE,433) LNØ,RHØRK                   TAU01430
          RHØ=RHØRK-RDENS                                               TAU01440
   799     CØNTINUE
          I=1                                                           TAU01450
      501 READ 442 ,XX,ZZ ,ICØDE ,IAL                                   TAU01460
          X(I)=XX                                                       TAU01470
          Z(I)=ZZ                                                       TAU01480
           IALTE(I)=IAL                                                 TAU01490
          PRINT 7032,X(I),Z(I),ICØDE ,IAL                               TAU01500
   7032   FØRMAT(2X,2F11.3,3X,2I1)                                      TAU01510
          IF(ISW(1).EQ.1) GØ TØ 7008                                    TAU01520
           IF(IREST.EQ.1) GØTØ 7008
          WRITE(JTAPE,442)X(I),Z(I),ICØDE,IAL                           TAU01530
     7008 CØNTINUE                                                      TAU01540
          N=I                                                           TAU01550
      I=I+1                                                             TAU01560
      IF(ICØDE-9)801,810,801                                            TAU01570
810    CØNTINUE                                                         TAU01580
       IF(IREST .EQ.1) GØ TØ 811
      CALL WEIG2 (X,Z,N,FX,M,SUM,RHØRK,TEST,DSU)                        TAU01590
811    CØNTINUE                                                         TAU01600
       IF(ISW(3).EQ.0) PRINT 47                                         TAU01610
C                                                                       TAU01620
C      FIELD PØINT DØ LØØP                                              TAU01630
C                                                                       TAU01640
      DØ 421 K=KFXN,M                                                   TAU01650
      SDELZ=0.                                                          TAU01660
C                                                                       TAU01670
C      PØLYGØN PØINTS DØ LØØP                                           TAU01680
C                                                                       TAU01690
      DØ 3004I=1,N                                                      TAU01700
       IDUM=I                                                           TAU01710
  205 EXXX=X(I) - FX(K)                                                 TAU01720
      ZEEE=Z(I) - FZ(K)                                                 TAU01730
       CALL CØMP                                                        TAU01740
 3004 CØNTINUE                                                          TAU01750
       IF(ILØØP.EQ.1) PDELZ(K)=RHØD*(13.34*SDELZ-PCØN(K)/RHØ),GØTØ3005  TAU01760
      PDELZ(K)=13.34*RHØ*SDELZ                                          TAU01770
3005   CØNTINUE                                                         TAU01780
      SSELZ(K)=SSELZ(K)+PDELZ(K)                                        TAU01790
       IF(LNØ-1)4101,5001,4101                                          TAU01800
 5001  BGTD = BGA(K)+PDELZ(K)*(2.67-RHØRK)/RHØ                          TAU01810
 5008  PRINT 5007,K,FX(K),FZ(K),PDELZ(K),BGTD                           TAU01820
 5007  FØRMAT(I5,4F10.2)                                                TAU01830
C
C     TØ WRITE CØMPLETE BØUGUER ANØMALY ØN JTAPE
C
       IF(ISW(1).EQ.1)  GØ TØ 7009
       WRITE(JTAPE,5007)K,FX(K),FZ(K),PDELZ(K),BGTD
        GØ TØ 7009
 4101 CØNTINUE                                                          TAU01850
      IF(ISW(3).EQ.1) GØ TØ 7022                                        TAU01860
      PRINT 44,K,FX(K),FZ(K),PDELZ(K) ,DSU(K)                           TAU01870
 7022 CØNTINUE                                                          TAU01880
 5008  CØNTINUE                                                         TAU01890
       IF(ISW(9).EQ.1) GØ TØ 7009                                       TAU01900
       IF(ILØØP.EQ.1) GØ TØ 7009                                        TAU01910
      IF(ISW(1).EQ.1) GØ TØ 7009                                        TAU01920
       IF(IREST.EQ.1) GØTØ 7009
       WRITE(JTAPE,44)K,FX(K),FZ(K),PDELZ(K)                            TAU01930
 7009 CØNTINUE                                                          TAU01940
  421 CØNTINUE                                                          TAU01950
      IF(ISW(4).EQ.1) GØ TØ 423                                         TAU01960
      CALL PLØTER(PDELZ,M,BAR)                                          TAU01970
423   CØNTINUE                                                          TAU01980
      IF(L-LNØ) 60,430,60                                               TAU01990
  430  REFCØR = REFBGA-SSELZ(J)                                         TAU02000
      DØ  422K=KFXN,M                                                   TAU02010
      SSELZ(K) = SSELZ(K) + REFCØR                                      TAU02020
422    CØNTINUE                                                         TAU02030
       SREFC=SREFC+REFCØR                                               TAU02040
       IRES=0                                                           TAU02050
       RSØLD=RSQ                                                        TAU02060
       RSQ=0                                                            TAU02070
       RESF=0
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C                                                                        TAU02080
C      CALCULATING THE RMS ERRØR                                         TAU02090
C                                                                        TAU02100
        DØ 4422 K=KFXN,M
        IF(   ØGA(K).GE.900) GØTØ 4422
       RESA(K)=SSELZ(K)-ØGA(K)                                           TAU02130
 4422   CØNTINUE
        DØ 4424 K=KFXN,M                                                 TAU02110
        IF(ØGA(K).GE.900) GØ TØ 4424                                     TAU02120
        IF(NFER.LT.1) FER(K)=RESA(K) ;GØTØ4029
        FER(K)=0
        WTFE=0
        KSTART=K-NFER
        KEND=K+NFER
        DØ 4020 KH=KSTART,KEND
        IF(ØGA(KH).GE.900. .ØR.KH.LT.1 .ØR. KH.GT.M) GØ TØ 4020
        FER(K)=FER(K)+RESA(KH)*WFER(K-KH)
        WTFE=WTFE+WFER(K-KH)
 4020    CØNTINUE
        FER(K)=FER(K)/WTFE
 4029    CØNTINUE
        IRES=IRES+1                                                      TAU02140
        RESF=FER(K)**2+RESF
        RSQ=RESA(K)**2+ RSQ                                              TAU02150
 4424   CØNTINUE                                                         TAU02160
        RESF=SQRT(RESF/IRES)
        RSQ=SQRT(RSQ/IRES)                                               TAU02170
        WRITE(IØUT,4425) IMØD,RSQ,IRES,RESF                              TAU02180
 4425   FØRMAT(2X,'IMØD=',I5,', RMS ERRØR=',F10.5,', NUMBER ØF PØINTS=',I5,
      * ', FILTERED RMS ERRØR= ',F10.5)
        IF(IMØD.GT.IMAX ) GØ TØ 438
        IF(ISW(13).EQ.1 .AND. IFIRST.EQ.0) GØTØ 439
 4423   CØNTINUE
        IFIRST=1
        IF(ISW(10).EQ.1.AND.IMØD.LE.1)  GØ TØ 4427
        IF(ISW(6).EQ.0 .ØR.IMØD.GT.IMAX .ØR.((RSØLD-.5).LT.RSQ  .AND.
      * (IMØD .GT. 1)))GØTØ 438
C      BRANCHING ØUT ØF MØDEL ALTERING PART ØF M PRØGRAM
 4427    CØNTINUE
        DØ 4426 LQ=1,MCH                                                 TAU02210
        DØ 4426 LQQ=1,MCH+1                                              TAU02220
 4426   AA(LQ,LQQ)=0                                                     TAU02230
        XO(1)=X(N)                                                       TAU02240
        ZO(1)=Z(N)                                                       TAU02250
        K=JREF                                                           TAU02260
        MCH=0                                                            TAU02270
C                                                                        TAU02280
C   CØMPUTATIØN ØF D/DZ FØR THE REFERENCE PØINT                          TAU02290
C                                                                        TAU02300
        DØ 7650 I=1,N-1                                                  TAU02310
        IF(IALTE(I).EQ.0) GØ TØ 7650                                     TAU02320
        SDELZ=0                                                          TAU02330
        DØ 7640 IDUM=1,5                                                 TAU02340
        II=IDUM                                                          TAU02350
        ARG=X(I+1)-X(I-1)                                                TAU02360
        EXXX=X(I+KK(II)) -FX(K)                                          TAU02370
        ZEEE=Z(I+KK(II))-FZ(K)+D(II)*SIGN(1.,ARG)                        TAU02380
        CALL CØMP                                                        TAU02390
  7640  CØNTINUE                                                         TAU02400
        MCH=MCH+1                                                        TAU02410
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            RFDEL(MCH)=13.34*RHØD*SDELZ                                      TAU02420
    7650    CØNTINUE                                                         TAU02430
    4701    FØRMAT(1X,I2,10G10.3)                                            TAU02440
            KCØDE=0                                                          TAU02450
            IF(ISW(7).EQ.1) WRITE(IIØUT,4701) KCØDE,K, (RFDEL(KD),KD=1,MCH)  TAU02460
    C                                                                        TAU02470
    C     STØRING THE ØLD VALUES ØF PDELZ                                    TAU02480
    C                                                                        TAU02490
            IF(ILØØP.EQ.1) GØ TØ 434                                         TAU02500
            DØ 432 K=KFXN,M                                                  TAU02510
    432     PCØN(K)=PDELZ(K)                                                 TAU02520
            GØ TØ 436                                                        TAU02530
    434     DØ 435 K=KFXN,M                                                  TAU02540
    435     SSELZ(K)=SSELZ(K)-PDELZ(K)                                       TAU02550
    C  SSELZ(K) IS NØW THE SUMMED VALUE ØF ALL PØLYGØN CØNTRIBUTIØNS
    C      EXCEPT THAT DUE ØT THE CHANGED PART ØF THE MØDEL
            SREFC=SREFC-PDELZ(JREF)                                          TAU02560
    436     CØNTINUE                                                         TAU02570
            ILØØP=1                                                          TAU02580
            IMØD=IMØD+1                                                      TAU02590
    CC                                                                       TAU02600
    C      FIELD PØINT DØ LØØP                          :                    TAU02610
    C                                                                        TAU02620
            DØ 7850 K=KFXN,M                                                 TAU02630
            IF(ØGA(K).GE.900) GØ TØ 7850
            IF(K.EQ.JREF) GØ TØ 7850                                         TAU02650
            MCH=0                                                            TAU02640
    C                                                                        TAU02660
    C    CØMPUTING D/DZ FØR EACH CHANGEABLE PØLY PØINT                       TAU02670
    C                                                                        TAU02680
            DØ 7830 I=1,N-1                                                  TAU02690
            IF(IALTE(I).EQ.0) GØ TØ 7830                                     TAU02700
           SDELZ=0.                                                          TAU02710
            DØ 7820 II=1,5                                                   TAU02720
            ARG=Y(I+1)-X(I-1)                                                TAU02730
            EXXX=X(I+KK(II)) -FX(K)                                          TAU02740
            ZEEE=Z(I+KK(II))-FZ(K)+D(II)*SIGN(1.,ARG)                        TAU02750
            IDUM=II                                                          TAU02760
            CALL CØMP                                                        TAU02770
    7820    CØNTINUE                                                         TAU02780
            MCH=MCH+1                                                        TAU02790
            DDELZ(MCH)=13.34 *RHØD*SDELZ-RFDEL(MCH)                          TAU02800
    7830    CØNTINUE                                                         TAU02810
            KCØDE=1                                                          TAU02820
            IF(ISW(7).EQ.1) WRITE(IIØUT,4701) KCØDE,K, (DDELZ(KD),KD=1,MCH)  TAU02830
    C    NØW ADD THE CØNTRIBUTIØN TØ THE NØRMAL EQUATIØN                     TAU02840
    C                                                                        TAU02850
            DØ 7835 II=1,MCH                                                 TAU02860
            DØ 7834 IP=1,MCH                                                 TAU02870
            AA(II,IP)=AA(II,IP)+DDELZ(IP)*DDELZ(II)                          TAU02880
    7834    CØNTINUE                                                         TAU02890
            AA(II,MCH+1)=AA(II,MCH+1)+FER (K)*DDELZ(II)                      TAU02900
    7835    CØNTINUE                                                         TAU02910
    7850    CØNTINUE                                                         TAU02920
    C    WE HAVE NØW FINISHED SETTING UP THE NØRMAL EQUATIØNS                TAU02930
            EPS=1.E-20                                                       TAU02940
            INDIC=+1                                                         TAU02950
             NRC=20                                                          TAU02960
    C                                                                        TAU02970
    C    NØTE THAT NRC IS THE NUMBER ØF CØLUMS IN THE MATRIX AA              TAU02980
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      C                                                                 TAU02990
            MP1=MCH+1                                                   TAU03000
            IF(ISW(7).EQ.1) OUTPUT 'NORMAL EQUATIONS';WRITE(IIOUT,4540  TAU03010
           * ),(MP1,(AA(II,JJ),JJ=1,MP1),II=1,MCH)                      TAU03020
       4540 FORMAT(NG1).3)                                              TAU03030
            CALL SIMUL(MCH,AA,XS,EPS,INDIC,NRC,DETER)                   TAU03040
            IF(ISW(7).EQ.1) OUTPUT DETER,(XS(IN),IN=1,MCH)              TAU03050
      C     CALCULATE THE NEW VALUES OF THE POYGON POINTS               TAU03060
            MCH=0                                                       TAU03070
            DO 7860 K=1,N                                               TAU03080
            IF(IALTE(K).EQ.0) GO TO 7850                                TAU03090
            MCH=MCH+1                                                   TAU03100
            Z( )=Z(K)+XS(MCH)*2*DEL                                     TAU03110
            IF(Z(K).LT.0.2) Z(K)=.2
       7860 CONTINUE                                                    TAU03120
            IF(ISW(7).EQ.1) OUTPUT 'NEW POLY POINTS'; OUTPUT,(Z(K),K=1,N)  TAU03130
            GO TO 411                                                   TAU03140
       435  CONTINUE                                                    TAU03150
            IF(ILOOP.EQ.0) GO TO 439                                    TAU03160
      C     MAKING THE WEIGT CALCULATION FOR THE MODIFIED POLYGON       TAU03170
      C   AA IS JUST A GARBAGE ARRAY                                    TAU03180
            CALL WEIG2(X,Z,N,FX,M,AA, 1.  ,AA,DWGT )                    TAU03190
            DO 441 K=KFXN,M                                             TAU03200
            IF(IREST.EQ.1) SUM(K)=STSUM(K)
            STSUM(K)=SUM(K)
      C    STORING THE VALUE OF SUM TO USE IN FUTURE CALCULATIONW
       441  SUM(K)=SUM(K)+(DWGT (K)-DSU(K)/RHORK)        *RHOD          TAU03210
      C   DWGT(K) IS BEING USED FOR TEMPORARY STORAGE
            OUTPUT 'NEW POLY PHINTS -FINAL VERSION'                     TAU03220
            WRITE(IIOUT,440)(X(K),Z(K),K=1,N)                           TAU03230
       440  FORMAT(2X,2F10.2)                                           TAU03240
            IF(IREST.EQ.1) GOTO 4041
            IF(ISW(1).EQ.0) WRITE(JTAPE,42) (X(K),Z(K),K=1,N-1);
           * WRITE(JTAPE,442) X(N),Z(N),ICODE
       4041 CONTINUE
       439  PRINT 51                                                    TAU03290
            DO 7000 K=KFXN,M
            DWGT(K)=SUM(K)-RWGT                                         TAU03310
            SSSSS=SSELZ(K)-SREFC                                        TAU03320
            IF(ISW(12).EQ.1)
           *  DWGT(K) =DWGT(K) +ARRAY(K,5)*2.67
            PRINT52,K,FX(K),FZ(K),SSSSS,SSELZ(K),RESA(K),BGA(K)         TAU03330
           1,SUM(K),DWGT(K) ,TEST(K),FER(K)                             TAU03340
        52  FORMAT(I5,6F10.2,F16.0,F16.0,F16.0,F6.1)
       483  CONTINUE                                                    TAU03350
           IF(ISW(1).EQ.1) GO TO 7000                                   TAU03370
            IF(IREST.EQ.1) GOTO 7000
            WRITE(JTAPE,52)K,FX(K),FZ(K),SSSSS,SSELZ(K),RESA(K),BGA(K)  TAU03380
           1 ,SUM(K),DWGT(K)                                            TAU03390
       7000 CONTINUE                                                    TAU03400
            CALL PLOTER(DWGT,M,BAR)                                     TAU03410
       4220    CONTINUE                                                 TAU03420
           IF(ISW(1).EQ.1) GO TO 7013                                   TAU03430
            END FILE JTAPE                                              TAU03440
       7013 CONTINUE                                                    TAU03450
       610  CONTINUE                                                    TAU03470
            IF(ISW(5).EQ.1) N4=5
           ARRAY(200,1)=ARRAY(M,1)                                      TAU03490
            CALL PLOTA(LNB,ARRAY,200,N4,M,0,0,1,FDUM,FDUM)              TAU03530
            OUTPUT ' 1= THEORETICAL GRAVITY IN MILIGALS'                TAU03540
           ØUTPUT ' 2= DIFFERENCE BETWEEN THEØRETICAL AND ØBSERVED GRAVITY'  TAU03550
           ØUTPUT ' 3= ØBSERVED GRAVITY'                                     TAU03560
           ØUTPUT ' 4= ELEVATIØN IN 10 S ØF METERS'                          TAU03570
           IF(ISW(13).EQ.1 .AND. IFIRST .EQ.0) GØTØ 4423
      999  CØNTINUE                                                          TAU03580
      C  STØRING THE VALUE ØF X
           IF(ISW(6) .NE.1) GØ TØ 7011
           READ(IIN,433,END=7011) LNØ,RHØNEW
           IF(LNØ.NE.99) GØ TØ 7011
           IREST=1
           IMØD=0
           RSU=1.E70
           DØ 630 K=KFXN,M
      630  SSELZ(K)=SSELZ(K)-PDELZ(K)
      C  SSELZ(K) IS NØW THE SUMMED VALUE ØF ALL PØLYGØN CØNTRIBUTIØNS
      C      EXCEPT THAT DUE ØT THE CHANGED PART ØF THE MØDEL
            ØUTPUT ' NØW RECALCULATING THE MØDEL USING NEW VARIABLE PØLYPØINT
          *S'
            GØ TØ 799
      C    IREST IS SET EQUAL TØ 1 TØ INDICATE THAT
      C   WE ARE READING AN ADDITIØN SET ØF PØINTS FØR THE LAST
      C    PØLYGØN  TØ SEE THE EFFECT ØF USING DIFFERENT
      C    VARIABLE PØLYGØN PØINTS
      7011  CØNTINUE
           CALL TØC(TIME)
           ØUTPUT TIME
           STØP                                                              TAU03620
           SUBRØUTINE CØMP                                                   TAU03630
          RR=EXXX**2+ZEEE**2                                                 TAU03640
          IF(EXXX)210,240,280                                                TAU03650
      210 IF(ZEEE)220,230,230                                                TAU03660
      220 THETB=ATAN(ZEEE/EXXX)-3.1415927                                    TAU03670
          GØ TØ 301                                                          TAU03680
      230 THETB=ATAN(ZEEE/EXXX)+3.1415927                                    TAU03690
          GØ TØ 301                                                          TAU03700
      240 IF(ZEEE)250,260,270                                                TAU03710
      250 THETB=-1.5707963                                                   TAU03720
          GØ TØ 301                                                          TAU03730
      260 THETB=0.                                                           TAU03740
          GØ TØ 301                                                          TAU03750
      270 THETB=1.5707963                                                    TAU03760
          GØ TØ 301                                                          TAU03770
      280 THETB=ATAN(ZEEE/EXXX)                                              TAU03780
     301   IF(IDUM-1) 3001,3002,3001                                         TAU03790
     3001 CHECK=EXX*ZEEE-ZEE*EXXX                                            TAU03800
          IF(CHECK)320,310,320                                               TAU03810
      310 DELZ=0.                                                            TAU03820
          GØ TØ 401                                                          TAU03830
      320 ØMEGA=THETA-THETB                                                  TAU03840
          IF(ØMEGA)3201,3202,3202                                            TAU03850
     3202 IF(ØMEGA-3.1415927)330,330,340                                     TAU03860
     3201 IF(ØMEGA+3.1415927)340,330,330                                     TAU03870
      330 DTHET=ØMEGA                                                        TAU03880
          GØ TØ 370                                                          TAU03890
      340 IF(ØMEGA)351,360,360                                               TAU03900
      351 DTHET=ØMEGA+6.2831853                                              TAU03910
          GØ TØ 370                                                          TAU03920
      360 DTHET=ØMEGA-6.2831853                                              TAU03930
      370 A=CHECK/((EXXX-EXX)**2+(ZEEE-ZEE)**2)                              TAU03940
          B=(EXXX-EXX)*DTHET                                                 TAU03950
```

```
       C=0.5*(ZEEE-ZEE)*ALOG(RR/R)                                      TAU03960
      DELZ=A*(B+C)                                                      TAU03970
  401 SDELZ=SDELZ+DELZ                                                  TAU03980
 2002 EXX=EXXX                                                          TAU03990
      ZEE=ZEEE                                                          TAU04000
      R=RR                                                              TAU04010
      THETA=THETB                                                       TAU04020
       RETURN                                                           TAU04030
       END                                                              TAU04040
```

```
NAME   TYPE CLASS    HEX     DEC       NAME   TYPE CLASS    HEX     DEC       NAME   TYPE CLASS    HEX     DEC
                     LØC     WØRDS                          LØC     WØRDS                          LØC     WØRDS
----   ---- -----  -------   -----     ----   ---- -----  -------   -----     ----   ---- -----  -------   -----
A         R SCALR  01037 V       1     AA        R ARRAY  00D5A V     420     ALØG      R SPRØG  INTRIN
ARG       R SCALR  0101F V       1     ARRAY     R ARRAY  0001A V    1000     ATAN      R SPRØG  INTRIN
B         R SCALR  01038 V       1     BAR       L SCALR  00000 V       1     BGTD      R SCALR  01012 V       1
C         R SCALR  01039 V       1     CC        R SCALR  01002 V       1     CHECK     R SCALR  01030 V       1
CØME      R ARRAY  00C14 V       5     CØMP        SPRØG  00720 P             CØMP      R SCALR  0102D V       1
D         R ARRAY  00F03 V       5     DDELZ     R ARRAY  00F08 V      20     DEL       R SCALR  00FEB V       1
DELFX     R SCALR  00FFB V       1     DELZ      R SCALR  01033 V       1     DETER     R SCALR  01027 V       1
DSU       R ARRAY  00384 V     200     DTHET     R SCALR  01036 V       1     DWGT      R ARRAY  00A44 V     200
EPS       R SCALR  01022 V       1     EXX       R SCALR  01031 V       1     EXXX      R SCALR  01010 V       1
FDUM      R SCALR  0102A V       1     FER       R ARRAY  00000 C     200     FX        R ARRAY  0001A V     200
FXI       R SCALR  00FFA V       1     FZ        R ARRAY  00402 V     200     I         I SCALR  00FED V       1
IAL       I SCALR  0100C V       1     IALTE     I ARRAY  00CC4 V     150     ICØDE     I SCALR  01003 V       1
IDUM      I SCALR  0100F V       1     IFIRST    I SCALR  00FE8 V       1     II        I SCALR  0101D V       1
IIN       I SCALR  00FEE V       1     IIØUT     I SCALR  00FF0 V       1     ILØØP     I SCALR  00FE5 V       1
IMAX      I SCALR  00FFE V       1     IMØD      I SCALR  00FEA V       1     INDIC     I SCALR  01023 V       1
IP        I SCALR  01021 V       1     IPUN      I SCALR  00FEF V       1     IRES      I SCALR  01014 V       1
IREST     I SCALR  00FE7 V       1     ISW       I SPRØG  EXTERN            IW        I SCALR  01028 V       1
IZERØ     I SCALR  00FFF V       1     J         I SCALR  01003 V       1     JJ        I SCALR  01026 V       1
JREF      I SCALR  01005 V       1     JTAPE     I SCALR  00FF2 V       1     K         I SCALR  00FE4 V       1
KCØDE     I SCALR  0101F V       1     KD        I SCALR  01020 V       1     KEND      I SCALR  01019 V       1
KFXN      I SCALR  00FF3 V       1     KH        I SCALR  0101A V       1     KK        I ARRAY  00EFE V       5
KL        I SCALR  01002 V       1     KSTART    I SCALR  01018 V       1     KU        I SCALR  00FF5 V       1
K1        I SCALR  01001 V       1     L         I SCALR  00FF4 V       1     LABEL     I ARRAY  00001 V      20
LNØ       I SCALR  01006 V       1     LQ        I SCALR  0101B V       1     LQQ       I SCALR  0101C V       1
M         I SCALR  00FFC V       1     MCH       I SCALR  00FEC V       1     MP1       I SCALR  01025 V       1
N         I SCALR  0100D V       1     NFER      I SCALR  00FFD V       1     NRC       I SCALR  01024 V       1
N4        I SCALR  00FF1 V       1     ØGA       R ARRAY  00724 V     200     ØGGA      R ARRAY  00272 V     200
ØMEGA     R SCALR  01034 V       1     PCØN      R ARRAY  00B0C V     200     PDELZ     R ARRAY  004CA V     200
PLØTA       SPRØG  EXTERN              PLØTER      SPRØG  EXTERN            R         R SCALR  0103A V       1
RDENS     R SCALR  00FF6 V       1     REFCØR    R SCALR  01013 V       1     REFØGA    R SCALR  01004 V       1
REFX      R SCALR  00FF9 V       1     RESA      R ARRAY  001AA V     200     RESF      R SCALR  01016 V       1
RFDEL     R ARRAY  00C9C V      20     RHØ       R SCALR  01008 V       1     RHØD      R SCALR  00FF8 V       1
RHØNEW    R SCALR  0102B V       1     RHØRK     R SCALR  01007 V       1     RR        R SCALR  0102E V       1
RSØLD     R SCALR  01015 V       1     RSQ       R SCALR  00FE9 V       1     RWGT      R SCALR  00FF7 V       1
SDELZ     R SCALR  0100E V       1     SIGN      R SPRØG  INTRIN            SIMUL       SPRØG  EXTERN
SQRT      R SPRØG  INTRIN              SREFC     R SCALR  00FE6 V       1     SSELZ     R ARRAY  000E2 V     200
SSSSS     R SCALR  01029 V       1     STSUM     R ARRAY  00F1C V     200     SUM       R ARRAY  0097C V     200
SUMW      R ARRAY  009C4 V     200     TEST      R ARRAY  007EC V     200     THETA     R SCALR  01035 V       1
THETØ     R SCALR  0102F V       1     TIC         SPRØG  EXTERN            TIME      R SCALR  0102C V       1
TØC         SPRØG  EXTERN              WEIG2       SPRØG  EXTERN            WFER      R ARRAY  000C3 C      21
WTFE      R SCALR  01017 V       1     X         R ARRAY  00593 V     200     XS        R ARRAY  00CB0 V      20
XX        R SCALR  01009 V       1     XØ        R ARRAY  00592 V       1     Z         R ARRAY  0065C V     200
ZEE       R SCALR  01032 V       1     ZEEF      R SCALR  01011 V       1     ZZ        R SCALR  0100A V       1
ZC        R ARRAY  0065A V       1


         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC
-----   -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
    1   00018         21   0023E         42   00075         44   0007C         45   00080         47   0008C
   51   0009A         52   00649         53   00236         56   000F2         59   00198         60   00242
   95   0022D        100   00010        101   0005C        102   00065        200   00185        201   001E3
  205   002C0        210   0072C        220   0072E        230   00734        240   0073A        250   00730
  260   00740        270   00743        280   00744        301   00741        310   00756        320   00759
  330   00765        340   00764        351   0076A        360   0076E        370   00771        400   0078E
  419   0010C        421   00347        422   00352        423   00356        427   0011C        430   00359
```

```
 432  00457      433  00241      434  0045E      435  00490      436  00498      438  005AC
 439  00614      440  005EC      441  005C3      442  00073      445  000C5      447  00075
 451  00265      453  00658      610  00657      620  001C1      630  005F5      799  00267
 801  00269      810  002A2      811  00260      999  0060D     3001  0074D     3002  00791
3004  002C8     3005  002DF     3201  00702     3202  0075E     4020  003A9     4029  003B2
4041  00614     4101  00314     4220  00680     4422  00379     4423  003F8     4424  003BC
4425  00307     4426  00419     4427  00411     4501  00225     4540  00547     4701  00465
5001  002E6     5006  002ED     5007  002F8     5008  00329     5960  0018B     5963  00190
7000  00676     7004  001D3     7005  00201     7008  0029C     7009  00347     7011  00711
7013  00687     7021  00221     7022  00329     7032  00283     7034  0021B     7640  00455
7650  00460     7820  004C4     7830  00407     7834  00501     7835  0050D     7850  00511
7860  00586

LØCAL VARIABLES (4155 WØRDS):

  00000 BAR      00001 LABEL    00015 CØME     0001A FX       0001A ARRAY    000E2 SSELZ
  001AA RESA     00272 ØGGA     00402 FZ       004CA PDELZ    00592 XO       00593 X
  0065B ZO       0045C Z        00724 ØGA      007EC TEST     008B4 DSU      0097C SUM
  00A44 DWGT     00B0C PCØN     00BD4 SUMW     00C9C RFDEL    00CB0 XS       00CC4 IALTE
  00D5A AA       00EFE KK       00F03 D        00F08 DDELZ    00F1C STSUM    00FE4 K
  00FE5 ILØØP    00FE6 SREFC    00FE7 IREST    00FE8 IFIRST   00FE9 RSQ      00FEA IMØD
  00FEB DEL      00FEC MCH      00FED I        00FEE IIN      00FEF IPUN     00FF0 IIØUT
  00FF1 N4       00FF2 JTAPE    00FF3 KFXN     00FF4 L        00FF5 KU       00FF6 RDENS
  00FF7 RWGT     00FF8 RHØC     00FF9 REFX     00FFA FXI      00FFB DELFX    00FFC M
  00FFD NFEP     00FFE IMAX     00FFF IZERØ    01000 KL       01001 K1       01002 CC
  01003 J        01004 REFØGA   01005 JREF     01006 LNØ      01007 RHØRK    01008 RHØ
  01009 XX       0100A ZZ       0100B ICØDE    0100C IAL      0100D N        0100E SDELZ
  0100F IDUM     01010 EXXX     01011 ZEEE     01012 BGTD     01013 REFCØR   01014 IRES
  01015 RSØLD    01016 RESF     01017 WTFE     01018 KSTART   01019 KEND     0101A KH
  0101B LQ       0101C LQQ      0101D II       0101E ARG      0101F KCØDE    01020 KD
  01021 IP       01022 EPS      01023 INDIC    01024 NRC      01025 MP1      01026 JJ
  01027 DETFR    01028 IW       01029 SSSSS    0102A FDUM     0102B RHØNEW   0102C TIME
  0102D CØMP     0102E RR       0102F THETB    01030 CHECK    01031 EXX      01032 ZEE
  01033 DELZ     01034 ØMEGA    01035 THETA    01036 DTHET    01037 A        01038 B
  01039 C        0103A R

BLANK CØMMØN (221 WØRDS):

  00000 FER        000CB NFER

ENTRY PØINTS:

  00720 CØMP

INTRINSIC SUBPRØGRAMS USED:

  ALØG       ATAN       SIGN       SQRT

EXTERNAL SUBPRØGRAMS REQUIRED:

  IGW        PLØTA      PLØTER     SIMUL      TIC        TØC        WEIG2      F:101
  F:102      F:103      F:104      F:105      F:106      F:108      M:D9       M:0C
  9ALØG      9ATAN1     9BCDRDEE   9BCDPLAD   9BCDWRIT   9ENDFILE   9ENDIØL    9INITIAL
  9IØDATA    9IPLUSA    9ITØR      9PRINT     9READ      9SETUPØ    9SQRT      9STØP
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC        HEX
                     WØRDS      WØRDS
                     -----      -----
   GENERATED CØDE:   1946       0079A
        CØNSTANTS:     35       00023
  LØCAL VARIABLES:   4155       0103B
            TEMPS:      8       00008
                     -----      -----
   TØTAL PRØGRAM:    6144       01800   (PLUS BLANK CØMMØN)
```

```
      SUBRØUTINE ALTD(ELEV,IDEP,HEIGT,KK)
C   VERSIØN ØF 13 JANUARY 1971
C  SUBRØUTINE ALTD,    RETURNS VALUE ØF HEIGT (NEGATIVE BELØW SEA
C          LEVEL).   KK RETURNS = 9 IF NEW DATA RECØRD SHØULD BE
C          READ,  ØTHERWISE KK = 0.
      KK=0
      A=ABS(ELEV)
      IF(A-0.004)100,100,200
C   ELEV = ZERØ
C  CHECKING DEPTH
  100   IF(IDEP)110,110,130
  110 KK=9
      GØ TØ 990
  120 HEIGT=ELEV
      GØ TØ 990
  130 HEIGT=-IDEP
      GØ TØ 990
C   ELEV NØT ZERØ
  200 IF(ELEV)210,100,210
  210 HEIGT=ELEV
      GØ TØ 990
  990 RETURN
      END
```

```
                     HEX     DEC                               HEX     DEC                                 HEX     DEC
NAME  TYPE CLASS     LØC     WØRDS      NAME  TYPE CLASS       LØC     WØRDS      NAME  TYPE CLASS        LØC     WØRDS
----  ---- -----  -------   -----       ----  ---- -----    -------   -----      ----  ---- -----     -------   -----
A        R SCALR   0C001 V      1       ABS      R SPRØG    INTRIN                ALTD       SPRØG      00000 P
ALTC     R SCALR   0C000 V      1       ELEV     R SCALR   *00002 V DUMMY         HEIGT    R SCALR     *00004 V DUMMY
IDEP     I SCALR  *CC003 V DUMMY        KK       I SCALR   *00005 V DUMMY

         HEX              HEX              HEX              HEX              HEX              HEX
LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
  100   0000E      110   C0010      120   CC013      130   C0016      200   0001B      210   0001D
  990   C002C

LØCAL VARIABLES (2 WØRDS):

   COCOC ALTD        OCOC1 A

BLANK CØMMØN (C WØRDS)

ENTRY PØINTS:

   COCOC ALTC

INTRINSIC SUBPRØGRAMS USED:

   ABS

EXTERNAL SUBPRØGRAMS REGUIRED:

   9ITØR      9SETLPN  .

HIGHEST ERRØR SEVERITY: C (NØ ERRØRS)

                    DEC       HEX
                   WØRDS     WØRDS
                   -----     -----
 GENERATEC CØDE:     33      COC21
      CØNSTANTS:      1      CCC01
LØCAL VARIABLES:      2      COC02
          TEMPS:      5      CCC05
                   -----     -----
  TØTAL PRØGRAM:     41      CCC29
```

```
      SUBRØUTINE ANØV2(ZZ,ZHT,NX,KGDA,KGMØ,KGYR,KGHM,KØGDA,XX,YY,INIT,
     1 DATA,IDEC)
C *   24 JULY 1974      - TØ ADD HØRIZ AND VERT ANNØTATIØN
C
C
C
C  SUBRØUTINE ANØV2 ANNØTATES PLØTTED PØINT WITH DATA VALUE, TIME, ØR DATE AND
C  TIME
C
C  SSW(3)  UP TØ ANNØTATE ØNLY AT CHANGE ØF DATE
C  SSW(7)  UP TØ ANNØTATE ØN LEFT SIDE ØF TRACK
C  SSW(11) UP TØ ANNØTATE ALTERNATELY ØN LEFT AND RIGHT SIDES ØF TRACK
C  SSW(18)  0 TØ HAVE ANNØTATIØNS AT RIGHT  ANGLES TØ INCREMENTAL TRACK
C           1 TØ ANNØTATE HØRIZØNTALLY
C           2 TØ ANNØTATE VERTICALLY
C           3 ØN TRACK HEADING 091 TØ 269, TØ INVERT ANNØTATIØN
C           4 TØ ANNØTATE EITHER HØRIZ ØR VERT DEPENDING UPØN DIRECTIØN
C
C      USES CALCØMP SUBRØUTINES AND ISW
C
      DIMENSIØN HM(4), ØNTH(2), DAY(2)
      HGT=0.07*ZHT
      IF(INIT) 80,80,85
C  THETA IS THE INCREMENTAL TREND ØF TRACK
   80 AX=XX-XØLD
      AY=YY-YØLD
C  ØPTIØN TØ PLØT VALUES HØRIZØNTALLY ØR VERTICALLY
      IF(ISW(18) .NE. 1) GØ TØ 110
      THATA=0
      IF(ABS(AY - 0.08)) 400,58,58
  110 IF(ISW(18) .NE. 2) GØ TØ 111
      THATA=1.57079
      IF(ABS(AX - 0.08)) 400,58,58
  111 CØNTINUE
       IF(ISW(18).EQ.4) GØ TØ 29
C  DETERMINE ANGLE ALØNG WHICH TØ ANNØTATE
      IF(AY) 50,51,51
   50 THATA=ABS(AY/AX)
      THATA=1.57079+ATAN(THATA)
      IF(AX.GT.0.) THATA=-THATA
      GØ TØ 59
   51 THATA=ABS(AX/AY)
      THATA=ATAN(THATA)
      IF(AX.GT.0.) THATA=-THATA
   59 IF(ISW(18).EQ.3.AND.THATA.GT.1.57079) THATA=THATA-3.14159
      IF(ISW(18).EQ.3.AND.THATA.LT.-1.57079) THATA=THATA+3.14159
       GØ TØ 58
   29  BX=ABS(XX-XØLD)
       BY=ABS(YY-YØLD)
       IF(BX-BY) 36,36,30
C   ANNØTATE VERTICALLY
   30  THATA=1.57079
       GØ TØ 58
C        ANNØTATE HØRIZØNTALLY
   36  THATA=0.0
   58 THETA=THATA*57.29578
C  CHECK IF DISTANCE INCREMENT ALØNG TRACK FRØM LAST DATA PØINT IS SUFFICIENT
C   THAT NEXT ANNØTATIØN DØES NØT ØVERPRINT LAST
       TAX=SQRT(AX*AX+AY*AY)
      IF(ISW(11)) 71,71,70
   70 TAX=TAX+0.04*ZHT
   71 TAX=TAX-0.08*ZHT
C  IF TAX IS NEGATIVE, INCREMENT IS INSUFFICIENT TØ ANNØTATE, RETURN
       IF(TAX)400,92,92
   92 IF(ISW(11).NE.1) GØ TØ 60
   61 KØUNT=KØUNT+1
      ISIDE=MØD(KØUNT,2)
      IF(ISIDE) 93,93,94
   60 IF(ISW(7)) 94,94,93
   93 ØFSET=-0.34
      GØ TØ 95
   94 ØFSET=0.08
   95 XXT=ØFSET*CØS(THATA)
      YYT=ØFSET*SIN(THATA)
      A=0.14*ZHT*SIN(THATA)
      B=0.14*ZHT*CØS(THATA)
      C=0.07*ZHT*SIN(THATA)
      D=0.07*ZHT*CØS(THATA)
      XT=XX+XXT
      YT=YY+YYT
  100 IF(NX.NE.1) GØ TØ 320
C  CHANGE HØUR AND MINUTE FØRMAT FRØM (I4) TØ (4I1) FØRMAT SØ TØ PRINT FØUR
C  DIGITS
      HM(1)=KGHM/1000
      HM(2)=(KGHM-HM(1)*1000.)/100.
      KHMI=HM(2)
      HM(2)=KHMI
      HM(3)=(KGHM-(HM(1)*1000.+HM(2)*100.))/10.
      KHMI=HM(3)
      HM(3)=KHMI
      HM(4)=KGHM-(HM(1)*1000.+HM(2)*100.+HM(3)*10.)
C  CHANGE DAY AND MØNTH FØRMATS FRØM (I2) TØ (2I1) SØ TØ PRINT TWØ DIGITS.
      DAY(1)=KGDA/10
      DAY(2)=KGDA-(DAY(1)*10.)
      ØNTH(1)=KGMØ/10
      ØNTH(2)=KGMØ-(ØNTH(1)*10.)
C  ANNØTATE DATA PØINT
  280 IF(KGDA.NE.KØGDA.AND.ISW(3).EQ.1) GØ TØ 291
      IF(KGDA-KØGDA)291,290,291
  291 CALL NUMBER(XT,YT,HGT,DAY(1),THETA,-1)
      XT=XT+D
      YT=YT+C
      CALL NUMBER(XT,YT,HGT,DAY(2),THETA,-1)
       XT=XT+B
       YT=YT+A
      CALL NUMBER(XT,YT,HGT,ØNTH(1),THETA,-1)
      XT=XT+D
      YT=YT+C
      CALL NUMBER(XT,YT,HGT,ØNTH(2),THETA,-1)
       XT=XT+B
       YT=YT+A
      YEAR=KGYR
      CALL NUMBER(XT,YT,HGT,YEAR,THETA,-1)
      IF(ISW(3).EQ.1) GØ TØ 340
      XT=XT+(2.0*B)
      YT=YT+(2.0*A)
  290 IF(ISW(3).EQ.1) GØ TØ 340
      CALL NUMBER(XT,YT,HGT,HM(1),THETA,-1)
      XT=XT+D
      YT=YT+C
      CALL NUMBER(XT,YT,HGT,HM(2),THETA,-1)
      XT=XT+D
      YT=YT+C
      CALL NUMBER(XT,YT,HGT,HM(3),THETA,-1)
      XT=XT+D
      YT=YT+C
      CALL NUMBER(XT,YT,HGT,HM(4),THETA,-1)
       GØ TØ 340
  320  CALL NUMBER (XT, YT, HGT, DATA, THETA, IDEC)
C  RETURN PEN TØ DATA PØINT
  340  CALL PLØT(XX,YY,3)
  342  XØLD=XX
       YØLD=YY
  400  RETURN
   85 KØUNT=0
      THATA=0.
      THETA=0.
      XØLD=0.
      YØLD=0.
      GØ TØ 60
       END
```

```
                         HEX     DEC                              HEX     DEC                              HEX     DEC
NAME    TYPE CLASS      LØC     WØRDS    NAME    TYPE CLASS      LØC     WØRDS    NAME    TYPE CLASS      LØC     WØRDS
----    ---- -----    --------  -----    ----    ---- -----    --------  -----    ----    ---- -----    --------  -----
A          R SCALR    00018 V       1    ABS        R SPRØG    INTRIN             ANØV2        SPRØG    00000 P
ANØV2      R SCALR    00000 V       1    ATAN       R SPRØG    INTRIN             AX         R SCALR    0000A V       1
AY         R SCALR    0000C V       1    B          R SCALR    00019 V       1    BX         R SCALR    0000F V       1
BY         R SCALR    00010 V       1    C          R SCALR    0001A V       1    CØS        R SPRØG    INTRIN
D          R SCALR    0001B V       1    DATA       R SCALR   *0002B V DUMMY      DAY        R ARRAY    00007 V       2
HGT        R SCALR    00009 V       1    HM         R ARRAY    00001 V       4    IDEC       I SCALR   *0002C V DUMMY
INIT       I SCALR   *0002A V DUMMY      ISIDE      I SCALR    00014 V       1    ISW        I SPRØG    EXTERN
KGDA       I SCALR   *00023 V DUMMY      KGHM       I SCALR   *00026 V DUMMY      KGMØ       I SCALR   *00024 V DUMMY
KGYR       I SCALR   *00025 V DUMMY      KHMI       I SCALR    0001E V       1    KØGDA      I SCALR   *00027 V DUMMY
KØUNT      I SCALR    00013 V       1    MØD        I SPRØG    INTRIN             NUMBER       SPRØG    EXTERN
NX         I SCALR   *00022 V DUMMY      ØFSET      R SCALR    00015 V       1    ØNTH       R ARRAY    00005 V       2
PLØT         SPRØG    EXTERN             SIN        R SPRØG    INTRIN             SQRT       R SPRØG    INTRIN
TAX        R SCALR    00012 V       1    THATA      R SCALR    0000E V       1    THETA      R SCALR    00011 V       1
XØLC       R SCALR    0000B V       1    XT         R SCALR    0001C V       1    XX         R SCALR   *00028 V DUMMY
XXT        R SCALR    00016 V       1    YEAR       R SCALR    0001F V       1    YØLD       R SCALR    0000D V       1
YT         R SCALR    0001D V       1    YY         R SCALR   *00029 V DUMMY      YYT        R SCALR    00017 V       1
ZHT        R SCALR   *00021 V DUMMY      ZZ           UNUSED  *00020 V DUMMY

        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LØC     LABEL     LØC     LABEL     LØC     LABEL     LØC     LABEL     LØC     LABEL     LØC
-----  -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----
   29  0006C       30    00078       36    0007B       50    0003C       51    0004A       58    0007D
   59  00056       60    000A6       61    0009D       70    0008D       71    00091       80    00015
   85  001C3       92    00098       93    000AB       94    000AE       95    000B0      100    000D2
  110  00028      111    00035      280    0011E      290    00179      291    00129      320    001B1
  340  001B9      342    001BE      400    001C2

LØCAL VARIABLES (32 WØRDS):

   00000 ANØV2       00001 HM          00005 ØNTH        00007 DAY         00009 HGT         0000A AX
   0000B XØLD        0000C AY          0000D YØLC        0000E THATA       0000F BX          00010 BY
   00011 THETA       00012 TAX         00013 KØUNT       00014 ISIDE       00015 ØFSET       00016 XXT
   00017 YYT         00018 A           00019 B           0001A C           0001B D           0001C XT
   0001C YT          0001E KHMI        0001F YEAR

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 ANØV2

INTRINSIC SUBPRØGRAMS USED:

   ABS        ATAN       CØS        MØD        SIN        SQRT

EXTERNAL SUBPRØGRAMS REQUIRED:

   ISW        NUMBER     PLØT       9ATAN1     9CØS       9ITØR      9RTØI      9SETUPN
   9SIN       9SQRT
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC       HEX
                     WØRDS     WØRDS
                     -----     -----
  GENERATED CØDE:      462     001CE
       CØNSTANTS:       23     00017
 LØCAL VARIABLES:       32     00020
           TEMPS:       17     00011
                     -----     -----
   TØTAL PRØGRAM:      534     00216
```

```
      SUBROUTINE ANOV3(XX,YY,DEPT,AMAG)
C           VERSION OF 15 DEC 1971,  ADD SIZE VARIABLE AND CHANG
C                 DEPTH LIMITS FOR SHALLOW EPICENTERS
C  SUBROUTINE ANOV3,  TO MAKE VARIABLE SIZED SYMBOS FOR
C           EPICENTER DATA DEPENDING UPON DEPTH AND MAGNITUDE
C
C  DEPT = DEPTH IN KM
C  AMAG = MAGNITUDE  (MAXIMUM IS 7.5)
C
C
      DATA ISTRT/0/
      IF(ISTRT)15,5,15
    5 OUTPUT 'ANOV3, VER 15 DEC 1971'
C     SIZE =1.0
      SIZE =2.0
      OUTPUT SIZE
      ISTRT = 1
C
C     END OF INITIALIZATION
C
   15 IF(DEPT- 70.0)20,20,22
   20 INTEG=1
      GO TO 50
   22 IF(DEPT-150.0)24,24,26
   24 INTEG=2
      GO TO 50
   26 IF(DEPT-300.0)28,28,30
   28 INTEG=5
      GO TO 50
   30 IF(DEPT-500.0)32,32,34
   32 INTEG=12
      GO TO 50
   34 INTEG=0
      GO TO 50
   50 IF(AMAG-4.5)52,52,54
   52 HF=1.0
      GO TO 100
   54 IF(AMAG-5.5)56,56,58
   56 HF=2.0
      GO TO 100
   58 IF(AMAG-6.5)60,60,62
   60 HF=3.0
      GO TO 100
   62 HF=4.0
      GO TO 100
  100 HGT=0.07*HF*SIZE
      CALL SYMBOL(XX,YY,HGT,INTEG,0.0,-1)
       RETURN
      END
```

```
                    HEX     DEC                               HEX     DEC                              HEX     DEC
NAME   TYPE CLASS   LØC     WØRDS     NAME   TYPE CLASS       LØC     WØRDS     NAME   TYPE CLASS      LØC     WØRDS
----   ---- -----  -------  -----     ----   ---- -----     -------  -----     ----   ---- -----    -------  -----
AMAG      R SCALR *00009 V DUMMY      ANØV3     R SCALR    00000 V      1     ANØV3       SPRØG    00000 P
DEPT      R SCALR *00008 V DUMMY      HF        R SCALR    00004 V      1     HGT       R SCALR    00005 V      1
INTEG     I SCALR  00003 V     1      ISTRT     I SCALR    00001 V      1     SIZE      R SCALR    00002 V      1
SYMBØL      SPRØG  EXTERN             XX        R SCALR   *00006 V DUMMY      YY        R SCALR   *00007 V DUMMY

        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC
-----  -----      -----  -----      -----  -----      -----  -----      -----  -----      -----  -----
    5  00005         15  00022         20  00025         22  00028         24  0002B         26  0002E
   28  00031         30  00034         32  00037         34  0003A         50  0003D         52  00040
   54  00043         56  00046         58  00049         60  0004C         62  0004F        100  00052

LØCAL VARIABLES (6 WØRDS):

   00000 ANØV3       00001 ISTRT       00002 SIZE        00003 INTEQ       00004 HF          00005 HGT

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 ANØV3

EXTERNAL SUBPRØGRAMS REQUIRED:

   SYMBØL     F:1C8       9ENDIØL     9IØDATA     9PRINT      9SETUPN

HIGHEST ERRØR SEVERITY:.0 (NØ ERRØRS)

                    DEC       HEX
                    WØRDS     WØRDS
                    -----     -----
  GENERATED CØDE:    95       0005F
       CØNSTANTS:    14       0000E
 LØCAL VARIABLES:     6       00006
           TEMPS:     5       00005
                    -----     -----
  TØTAL PRØGRAM:    120       00078
```

```
                  SUBRØUTINE AREAK(DLAT,DLØNG,IAKEY)
         C              VERSIØN ØF 1 DECEMBER 1971
         C
         C            VERSIØN ØF 18 ØCT 1971,  DUMMY RØUTINE
         C
         C             SUBRØUTINE AREAK,  GIVES VALUE TØ CØDE IAKEY WHICH MAY
         C                 SUBSEQUENTLY BE USED IN SØRTING GSUM RECØRDS INTØ A
         C                 SØ DESIGNATED BY DIFFERENT VALUES FØR IAKEY
         C
         C
                  IAKEY = 0
                  RETURN
                  END
```

```
                       HEX    DEC                                   HEX    DEC                                    HEX    DEC
NAME  TYPE CLASS       LOC    WORDS       NAME  TYPE CLASS          LOC    WORDS       NAME  TYPE CLASS           LOC    WORDS
----  ---- -----     -------  -----       ----  ---- -----        -------  -----       ----  ---- -----        -------  -----
AREAK      SPROG     00000 F              AREAK    R SCALR        00000 V      1       DLAT       UNUSED*00001 V DUMMY
DLONG      UNUSED*00002 V DUMMY           IAKEY    I SCALR       *00003 V DUMMY

LOCAL VARIABLES (1 WORD):

   00000 AREAK

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 AREAK

EXTERNAL SUBPROGRAMS REQUIRED:

   9SETLFN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                     DEC      HEX
                    WORDS    WORDS
                    -----    -----
  GENERATED CODE:       9    00009
       CONSTANTS:       0    00000
 LOCAL VARIABLES:       1    00001
           TEMPS:       4    00004
                    -----    -----
   TOTAL PROGRAM:      14 .  0000E
```

```
      SUBRØUTINE CALSC(A,B,C,D,SC,CC)
C  SUBRØUTINE CALSC, DETERMINES SIN AND CØS ØF ANGLE
C          ØF TILT ØF DIGITIZED MAP
      R=SQRT((C-A)**2+(D-B)**2)
      SC=(D-B)/R
      CC=(C-A)/R
      RETURN
      END
```

```
                           HEX     DEC                                 HEX     DEC                                  HEX     DEC
NAME   TYPE CLASS          LØC     WØRDS      NAME   TYPE CLASS        LØC     WØRDS      NAME   TYPE CLASS         LØC     WØRDS
----   ---- -----        -------   -----      ----   ---- -----      -------   -----      ----   ---- -----       -------   -----
A         R SCALR       *00002 V   DUMMY      B         R SCALR     *00003 V   DUMMY      C         R SCALR      *00004 V   DUMMY
CALSC     R SCALR        00000 V       1      CALSC       SPRØG      00000 P              CC        R SCALR      *00007 V   DUMMY
C         R SCALR       *00005 V   DUMMY      R         R SCALR      00001 V       1      SC        R SCALR      *00006 V   DUMMY
SQRT      R SPRØG        INTRIN

LØCAL VARIABLES (2 WØRDS):

   00000 CALSC        00001 R

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 CALSC

INTRINSIC SUBPRØGRAMS USED:

   SQRT

EXTERNAL SUBPRØGRAMS REQUIRED:

   9SETUPN    9SQRT

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC       HEX
                      WØRDS     WØRDS
                      -----     -----
   GENERATED CØDE:      28      0001C
        CØNSTANTS:       0      00000
  LØCAL VARIABLES:       2      00002
            TEMPS:       8      00008
                      -----     -----
   TØTAL PRØGRAM:       38      00026
```

```
      SUBRØUTINE CDATE (IDA1,IMØ1,IYR1,IHM1,
     1  IDA2,IMØ2,IYR2,IHM2,TIMD)
C
C * 2 DEC 1970 /2200 -- S.ABBØT
C   H-P ASA BASIC FØRTRAN (EXTEDDED)
C   MØDIFIED FØR SIGMA 7 -- 20 DEC 71
C
C  * PURPØSE:  CØMPARES TWØ DATES AND RETURNS THE TIME
C   DIFFERENCE IN DECIMAL HØURS (TIMD) ;
C   'TIMD' WILL BE NEGATIVE IF DATE 1 IS AFTER DATE 2.
C
C * EQUIVALENT TØ SUBR. 'CDATR' EXCEPT THAT THE HØUR-MINUTE
C   ARGUMENTS ARE SUPPLIED AS INTEGER NUMBERS.
C
C * THERE ARE NØ DATE LIMITS FØR INPUT DATA
C
      AHM1 = IHM1
      AHM2 = IHM2
      CALL NDH (IDA1,IMØ1,IYR1,AHM1,ID1,T1)
      CALL NDH (IDA2,IMØ2,IYR2,AHM2,ID2,T2)
C
C * CALCULATE TIME DIFFERENCE IN DECIMAL HØURS
C
      TIMD =(ID2 - ID1)
      TIMD = TIMD * 24.
      TIMD = TIMD + (T2-T1)
C
      RETURN
      END
```

```
                        HEX     DEC                             HEX     DEC                             HEX     DEC
NAME   TYPE CLASS       LØC     WØRDS     NAME   TYPE CLASS     LØC     WØRDS     NAME   TYPE CLASS     LØC     WØRDS
----   ---- -----     -------   -----     ----   ---- -----   -------   -----     ----   ---- -----   -------   -----
AHM1      R SCALR     00001 V       1     AHM2      R SCALR   00002 V       1     CDATE       SPRØG   00000 P
CDATE     R SCALR     00000 V       1     IDA1      I SCALR  *00007 V DUMMY     IDA2      I SCALR  *0000B V DUMMY
ID1       I SCALR     00003 V       1     ID2       I SCALR   00005 V       1     IHM1      I SCALR  *0000A V DUMMY
IHM2      I SCALR    *0000E V DUMMY     IMØ1      I SCALR  *00008 V DUMMY     IMØ2      I SCALR  *0000C V DUMMY
IYR1      I SCALR    *00009 V DUMMY     IYR2      I SCALR  *0000D V DUMMY     NDH         SPRØG   EXTERN
TIMC    . R SCALR    *0000F V DUMMY     T1        R SCALR   00004 V       1     T2        R SCALR   00006 V       1

LØCAL VARIABLES (7 WØRDS):

   00000 CDATE       00001 AHM1       00002 AHM2       00003 ID1        00004 T1         00005 ID2
   00006 T2

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 CDATE

EXTERNAL SUBPRØGRAMS REQUIRED:

   NDH         SITØR       9SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC      HEX
                     WØRDS    WØRDS
                     -----    -----
   GENERATED CØDE:     46     0002E
        CØNSTANTS:      1 .   00001
  LØCAL VARIABLES:      7     00007
            TEMPS:     10     0000A
                     -----    -----
    TØTAL PRØGRAM:     64     0004C
```

```
      SUBRØUTINE CHGMT(KDA,KMØ,KYR,KHM,KTZ,KGDA,
     1  KGMØ,KGYR,KGHM,NTZ)
      DIMENSIØN MØDAY(12)
C   SUBRØUTINE CHGMT TØ DETERMINE GMT DATE AND TIME
C         FRØM LØCAL TIME
C      THE SIGN ØF THE TIME ZØNE DIFFERENCE IS TØ GØ
C        FRØM GMT TIME TØ THE LØCAL TIME.  THUS IF
C        GMT = 1800, AND LØCAL = 1400,  KTZ = -04.
C
      MØDAY(1)=31
      MØDAY(2)=28
      MØDAY(3)=31
      MØDAY(4)=30
      MØDAY(5)=31
      MØDAY(6)=30
      MØDAY(7)=31
      MØDAY(8)=31
      MØDAY(9)=30
      MØDAY(10)=31
      MØDAY(11)=30
      MØDAY(12)=31
      KGHM=KHM-(KTZ*100)
      IF(KGHM)110,126,128
  110 KGHM=2400+(KHM-(KTZ*100))
      KGDA=KDA-1
      A=KYR
      B=KYR/4
      A=A/4.0
      IF(A-B)112,122,112
  112 IF(KGDA)114,114,120
  114 KGMØ=KMØ-1
      IF(KGMØ)116,118,116
  116 KGYR=KYR
      KGDA=MØDAY(KMØ-1)
      GØ TØ 150
  118 KGMØ=12
      KGDA=MØDAY(KGMØ)
      KGYR=KYR-1
      GØ TØ 150
  120 KGMØ=KMØ
      KGYR=KYR
      GØ TØ 150
  122 IF(KMØ-3)112,123,112
  123 IF(KDA-1)112,124,112
  124 KGDA=MØDAY(KMØ-1)+1
      KGMØ=KMØ-1
      KGYR=KYR
      GØ TØ 150
  126 KGDA=KDA
      KGMØ=KMØ
      KGYR=KYR
      GØ TØ 150
  128 IF(KGHM-2400)126,131,130
  131 KGHM=0000
  132 KGDA=KDA+1
      A=KYR
      B=KYR/4
      A=A/4.0
  134 IF(KGDA-MØDAY(KMØ))136,136,138
  136 KGMØ=KMØ
      KGYR=KYR
      GØ TØ 150
  138 KGDA=1
      KGMØ=KMØ+1
      IF(KGMØ-13)140,142,140
  140 KGYR=KYR
      GØ TØ 150
  142 KGMØ=1
      KGYR=KYR+1
      GØ TØ 150
  144 IF(KMØ-2)134,146,134
  146 IF(KGDA-29)134,136,138
  130 KK=KTZ*100
      KGHM=(KHM-KK)-2400
      GØ TØ 132
  150 KTZ=-KTZ
      RETURN
      END
```

```
                         HEX     DEC                                  HEX     DEC                                  HEX     DEC
NAME   TYPE CLASS        LOC     WORDS        NAME   TYPE CLASS        LOC     WORDS        NAME   TYPE CLASS        LOC     WORDS
----   ---- -----     -------   -----         ----   ---- -----     -------   -----         ----   ---- -----     -------   -----
A         R SCALR      0000D V       1        B         R SCALR      0000E V       1        CHGMT       SPROG      00000 P
CHGMT     R SCALR      00000 V       1        KDA       I SCALR     *00010 V DUMMY          KGDA      I SCALR     *00015 V DUMMY
KGHM      I SCALR     *00018 V DUMMY          KGMO      I SCALR     *00016 V DUMMY          KGYR      I SCALR     *00017 V DUMMY
KHM       I SCALR     *00013 V DUMMY          KK        I SCALR      0000F V       1        KMO       I SCALR     *00011 V DUMMY
KTZ       I SCALR     *00014 V DUMMY          KYR       I SCALR     *00012 V DUMMY          MODAY     I ARRAY      00001 V      12
NTZ       I SCALR     *00019 V DUMMY

        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LOC        LABEL   LOC        LABEL   LOC        LABEL   LOC        LABEL   LOC        LABEL   LOC
-----  -----       -----  -----       -----  -----       -----  -----       -----  -----       -----  -----
  110  0002D         112  00043         114  00045         116  0004A         118  00050         120  00059
  122  0005E         123  00061         124  00064         126  0006E         128  00075         130  000AD
  131  00079         132  0007B         134  0008B         136  0008F         138  00094         140  0009C
  142  0009F         144  000A5         146  000A8         150  000B5

LOCAL VARIABLES (16 WORDS):

   00000 CHGMT        00001 MODAY        0000D A            0000E B            0000F KK

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 CHGMT

EXTERNAL SUBPROGRAMS REQUIRED:

   9ITOR      9SETUPN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                      DEC       HEX
                     WORDS     WORDS
                     -----     -----
 GENERATED CODE:      185      000B9
      CONSTANTS:        3      00003
LOCAL VARIABLES:       16      00010
          TEMPS:       11      0000B
                     -----     -----
  TOTAL PROGRAM:      215      000D7
```

```
      SUBROUTINE COORR(X,Y,RLONG,RLAT,ITST,JTST)                        G3DC3810
C   CHANGES LAT AND LONG TO TRANSVERSE MERCATOR AND VICA VERSA          G3DC3820
C   VERSION OF JUNE 1972                                                G3DC3830
C      MODIFIED BY BRUCE SIMON                                          G3DC3840
      IIN=105                                                           G3DC3850
      IIOUT=108                                                         G3DC3860
       IF(JTST) 2,2,15                                                  G3DC3870
    2  IF(ITST)1,1,102                                                  G3DC3880
    1 CONTINUE                                                          G3DC3890
      ITST=1                                                            G3DC3900
      E2=.676865799E-2                                                  G3DC3910
      DTR=3.141592653/180.                                              G3DC3920
      RTD=1./DTR                                                        G3DC3930
      ARCRD=3600.*RTD*30.713114                                         G3DC3940
      AA=6378206.4                                                      G3DC3950
      AD=111132.089                                                     G3DC3960
      A=AD/DTR                                                          G3DC3970
      B=16216.944                                                       G3DC3980
      C=17.20937                                                        G3DC3990
      D=0.02273                                                         G3DC4000
      E=0.000033                                                        G3DC4010
      G1=1./25.523932E-10                                               G3DC4020
      AS=.484813681E-5                                                  G3DC4030
  101 CONTINUE                                                          G3DC4040
      READ(IIN,601) CMD,CMM,PZD,PZM,ISR,XZ,YZ                           G3DC4050
  601 FORMAT(F4.0,F6.3,F4.0,F6.3,I10,2F10.0)                            G3DC4060
      WRITE(IIOUT,607) CMD,CMM,PZD,PZM,ISR,XZ,YZ                        G3DC4070
  607 FORMAT(' CM=',F4.0,' DEG',F6.3,' MIN, PZ=',F4.0,' DEG',F6.3,' MING3DC4080
     1, ISR=',I6,' XZ=',F6.0,', YZ=',F6.0)                              G3DC4090
       XZ=XZ*1000.                                                      G3DC4100
       YZ=YZ*1000.                                                      G3DC4110
      PZ=PZD+PZM/60.                                                    G3DC4120
      CM=CMD+CMM/60.                                                    G3DC4130
      RCM=-CM*DTR                                                       G3DC4140
      RPZ=PZ*DTR                                                        G3DC4150
      IF(ISR) 5,6,5                                                     G3DC4160
    5 R=FLOAT(ISR-1)/FLOAT(ISR)                                         G3DC4170
      GO TO 7                                                           G3DC4180
    6 R=1.                                                              G3DC4190
    7 CONTINUE                                                          G3DC4200
      ELO=A*RPZ-B*SIN(2.*RPZ)+C*SIN(4.*RPZ)-D*SIN(6.*RPZ)               G3DC4210
     1 +E*SIN(8.*RPZ)                                                   G3DC4220
      ELO=ELO*R                                                         G3DC4230
      RM=AD-566.05*COS(2.*RPZ)+1.2*COS(4.*RPZ)                          G3DC4240
      RM=RM*R*RTD                                                       G3DC4250
      RETURN                                                            G3DC4260
  102 CONTINUE                                                          G3DC4270
      IFLG=2                                                            G3DC4280
       X=X*1000.                                                        G3DC4290
       Y=Y*1000.                                                        G3DC4300
      XP=X-XZ                                                           G3DC4310
      YP=Y-YZ                                                           G3DC4320
      P1=RPZ+YP/RM                                                      G3DC4330
   10 CONTINUE                                                          G3DC4340
      ELN=(A*P1-B*SIN(2.*P1)+C*SIN(4.*P1)-D*SIN(6.*P1)                  G3DC4350
     1 +E*SIN(8.*P1))*R                                                 G3DC4360
      DY=ARCRD*R/SQRT((1.-E2*(SIN(P1))**2)**3)                          G3DC4370
      YN=ELN-ELO                                                        G3DC4380
      DPN=(YP-YN)/DY                                                    G3DC4390
```

```
       P1=P1+DPN                                                        G3DC4400
       IFLG=IFLG-1                                                      G3DC4410
       IF(IFLG) 11,11,10                                                G3DC4420
  11   CONTINUE                                                         G3DC4430
CC                                                                      G3DC4440
C     P1 IS NEW THE TABULAR LATITUDE                                    G3DC4450
CC                                                                      G3DC4460
       T=(1.-E2*(SIN(P1))**2)                                           G3DC4470
       C=TAN(P1)*T**2/G1                                                G3DC4480
C     WE ARE NOW CALCULATING G RHO Z FACTOR                             G3DC4490
       SG1=(XP-(XP**3)*(T/R)**2/242.436946E+12)/R                       G3DC4500
       DELP=((SG1)**2*C/3600.)*DTR                                      G3DC4510
       P1=P1-DELP                                                       G3DC4520
C      P1 IS NOW THE TRUE LATTITUDE                                     G3DC4530
       T=(1.-E2*(SIN(P1))**2)                                           G3DC4540
       RN=AA/SQRT(T)                                                    G3DC4550
       DELL1=SIN(SG1/RN)/COS(P1)                                        G3DC4560
      DELLR=ARSIN(DELL1)                                                G3DC4570
       RLONG=-DELLR+RCM                                                 G3DC4580
      RLONG=-RLONG                                                      G3DC4590
       RLAT=P1                                                          G3DC4600
        X=X/1000.                                                       G3DC4610
        Y=Y/1000.                                                       G3DC4620
       RETURN                                                           G3DC4630
   15   DELLR=RCM+RLONG                                                 G3DC4640
        DELL1=SIN(DELLR)                                                G3DC4650
        P1=RLAT                                                         G3DC4660
        P2=P1                                                           G3DC4670
        T=1.-E2*(SIN(P2))**2                                            G3DC4680
        RN=AA/SQRT(T)                                                   G3DC4690
        SG1=RN*ARSIN(COS(P2)*DELL1)                                     G3DC4700
        DO 85 I=1,3                                                     G3DC4710
        C=TAN(P2)*T**2/G1                                               G3DC4720
        DELP=((SG1)**2*C/3600.)*DTR                                     G3DC4730
   85   P2=P1+DELP                                                      G3DC4740
        P1=P2                                                           G3DC4750
       ELN=(A*P1-B*SIN(2.*P1)+C*SIN(4.*P1)-D*SIN(6.*P1)                 G3DC4760
     1 +E*SIN(8.*P1))*R                                                 G3DC4770
        Y=ELN-ELO+YZ                                                    G3DC4780
        SG=R*SG1                                                        G3DC4790
       T=(1.-E2*(SIN(P1))**2)                                           G3DC4800
        XP=SG+SG**3*(T/R)**2/242.436946E+12                             G3DC4810
        X=XP+XZ                                                         G3DC4820
        X=X/1000.                                                       G3DC4830
        Y=Y/1000.                                                       G3DC4840
        RETURN                                                          G3DC4850
       END                                                              G3DC4860
```

```
                           HEX      DEC                                      HEX     DEC                                      HEX     DEC
NAME   TYPE CLASS          LOC      WORDS        NAME    TYPE CLASS          LOC     WORDS        NAME    TYPE CLASS          LOC     WORDS
----   ---- -----        -------    -----        ----    ---- -----        -------   -----        ----    ---- -----        -------   -----
A         R SCALR       CCCC9 V        1         AA         R SCALR       CCCC7 V       1         AD         R SCALR       00008 V       1
ARCRC     R SCALR       CCCC6 V        1         ARSIN      R SPROG       INTRIN                  AS         R SCALR       0000F V       1
B         R SCALR       CCCCA V        1         C          R SCALR       000CB V       1         CM         R SCALR       00018 V       1
CMD       R SCALR       0C010 V        1         CMM        R SCALR       00C11 V       1         COBRR      R SCALR       00000 V       1
COBRR       SPROG       0C000 P                  COS        R SPROG       INTRIN                  D          R SCALR       0000C V       1
DELLR     R SCALR       CC02B V        1         DELL1      R SCALR       CCC2A V       1         DELP       R SCALR       00028 V       1
DPN       R SCALR       0CC25 V        1         DTR        R SCALR       CCCC4 V       1         DY         R SCALR       00023 V       1
E         R SCALR       0C0CD V        1         ELN        R SCALR       00C22 V       1         ELO        R SCALR       0001C V       1
E2        R SCALR       0C0C3 V        1         FLOAT      R SPROG       INTRIN                  I          I SCALR       0002D V       1
IFLG      I SCALR       0C01E V        1         IIN        I SCALR       000C1 V       1         IIOUT      I SCALR       00002 V       1
ISR       I SCALR       0C014 V        1         ITST       I SCALR      *00C33 V   DUMMY         JTST       I SCALR      *00034 V   DUMMY
PZ        R SCALR       00017 V        1         PZD        R SCALR       00C12 V       1         PZM        R SCALR       00013 V       1
P1        R SCALR       0C021 V        1         P2         R SCALR       00C2C V       1         Q1         R SCALR       0000E V       1
R         R SCALR       0CC1B V        1         RCM        R SCALR       C0C19 V       1         RLAT       R SCALR      *00032 V   DUMMY
RLONG     R SCALR      *0C031 V    DUMMY         RM         R SCALR       CCC1D V       1         RN         R SCALR       00029 V       1
RPZ       R SCALR       CCC1A V        1         RTD        R SCALR       000C5 V       1         SG         R SCALR       0002E V       1
SG1       R SCALR       CC027 V        1         SIN        R SPROG       INTRIN                  SQRT       R SPROG       INTRIN
T         R SCALR       0C026 V        1         TAN        R SPROG       INTRIN                  X          R SCALR      *0002F V   DUMMY
XP        R SCALR       CCC1F V        1         XZ         R SCALR       CCC15 V       1         Y          R SCALR      *00030 V   DUMMY
YN        R SCALR       0CC24 V        1         YP         R SCALR       00C20 V       1         YZ         R SCALR       00016 V       1

        HEX                HEX                 HEX                 HEX                 HEX                 HEX
LABEL   LOC        LABEL   LOC         LABEL   LOC         LABEL   LOC         LABEL   LOC         LABEL   LOC
-----  -----       -----  -----        -----  -----        -----  -----        -----  -----        -----  -----
    1  CCC11           2  C00CF            5  CC083            6  C008C            7  0008E           10  000D0
   11  CC108          15  C0155           85  CC183          101  C0033          102  0008E          601  0003E
  607  CC052

LOCAL VARIABLES (47 WORDS):

   COCCC COBRR     000C1 IIN       000C2 IIOUT     0C0C3 E2        00004 DTR       00005 RTD
   COC06 ARCRD     0C0C7 AA        000C8 AD        00009 A         0000A B         0000B C
   COCCC D         CCCCD E         000CE Q1        0C0CF AS        00010 CMD       00011 CMM
   CCC12 PZD       00C13 PZM       00C14 ISR       0CC15 XZ        00016 YZ        00017 PZ
   C0018 CM        00019 RCM       000lA RPZ       0CC1B R         0001C ELO       0001D RM
   CCC1E IFLG      0001F XP        0002C YP        0C021 P1        00022 ELN       00023 DY
   COC24 YN        00025 DPN       00026 T         00C27 SG1       00028 DELP      00029 RN
   COC2A DELL1     000C2B DELLR    0002C P2        000C2C I        0002E SG

BLANK COMMON (C WORDS)

ENTRY POINTS:

   COCCC COBRR

INTRINSIC SUBPROGRAMS USED:

   ARSIN      COS        FLOAT      SIN        SQRT       TAN
```

```
EXTERNAL SUBPRØGRAMS REQUIRED:

   F$101       F$102       F$103       F$104       F$105       F$106       F$108       9ASIN
   9BCDREAD    9BCDWRIT    9CØS        9IØDATA     9ITØR       9SETUPN     9SIN        9SQRT
   9TAN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC      HEX
                   WØRDS    WØRDS
                   -----    -----
 GENERATED CØDE:    457     001C9
      CØNSTANTS:     23     00017
LØCAL VARIABLES:     47     0002F
          TEMPS:     11     0000B
                   -----    -----
  TØTAL PRØGRAM:    538     0021A
```

```
      SUBROUTINE DISAZ(ALAT,ALON,BLAT,BLON,IFRD,AZMTH,BAKAZ,DISKM,DISDG)
C THIS SUBROUTINE CALCULATES THE DISTANC FROM  APOINT A TO A POINT B
C      AN ALSO THE AZIMUTH CLOCKWISE FOR THE NORTH FROM A TO B
C      ALAT AND ALON ARE THE COORDINETS OF POINT A
C      BLAT AND BLON ARE THE COORDINETS OF POINT B
C     REMEMBER:::::
C       THE POSITION COORDINATES
C             - IS SOUTH AND WEST AND + IS NORTH AND EAST
C
C      IRAD IS AN OPTON TO INPUT EITHER DEGREES OR RADIANS FOR THE
C       IF IRAD = 0  STUFF IN DGERES ; 1 IF IN RADIANS
C     THIS PROGRAM CAME FOR  CALTECH(  ) AND A WAS REVISED FOR THE MIT
C        IBM1194 COMPUTER BY JOHN FAIRBORN, IT HEN WAS REVISED FOR THE
C       TH IBM 360 AT MIT BY JACK WOLFE .  NOW IT HAS BEEN REVISED FOR THE
C       SIGMA -7 COMPUTER AT WOODS HOLE (BY JACK WOLFE).    THE INEFFICIENCY
C       OF STORAGE ALLOCATION IS DUE TO THE MOST RECENT PROGRAMMERS
C     (JACK WOLFE)  LAZINES AND NEGLECT TO CLEAN UP ALLL THE JUNK
      DIMENSION TH(2),PHI(2),XDEG(2),DIST(2),AZ(2),AZINV(2)
      TAN(THETA)=SIN(THETA)/COS(THETA)
      I=1
      K=2
      TH(1)=ALAT
      TH(2)=BLAT
      PHI(1)=ALON
      PHI(2)=BLON
      IF(IFRD) 30,31,30
   31 DO 32   J=1,2
      TH(J)=TH(J)/57.2957795
   32 PHI(J)=PHI(J)/57.2957995
   30 CONTINUE
      THG = ATAN(.99328   *TAN(TH(K)))
      D = SIN(PHI(K))                                                   0090
      E = -COS(PHI(K))                                                  0100
      F = -COS(THG  )                                                   0110
      A =  F*E                                                          0120
      B = COS(THG  )*D                                                  0130
      C = SIN(THG  )                                                    0140
      G = -C*E                                                          0150
      H = C*D                                                           0160
      THG = ATAN(.99328   *TAN(TH(I)))
      D1 = SIN(PHI(I))                                                  0240
      E1 = -COS(PHI(I))                                                 0250
      F1 = -COS(THG  )                                                  0260
      C1 = SIN(THG  )                                                   0270
      A1 = F1*E1                                                        0280
      B1 = -F1*D1                                                       0290
      G1 = -C1*E1                                                       0300
      H1 = C1*D1                                                        0310
      SC = A*A1 + B*B1 + C*C1                                           0320
      SD = SQRT(((A -A1)**2 + (B-B1)**2 +(C-C1)**2)*((A +A1)**2 + (B+B1)  0330
     1**2 + (C+C1)**2)/4.0)                                             0340
      XDEG (I) = ATAN(SD/SC)*57.2957795                                 0350
      IF (SC) 1, 2, 2                                                   0360
    1 XDEG (I) = XDEG(I) + 180.0                                        0370
    2 SS = ((A1-D)**2 + (B1-E)**2 + C1**2 - 2.0)                        0380
      SC = ((A1-G)**2 + (B1-H)**2 + (C1-F)**2-2.0)                      0390
      AZ(I) = ATAN(SS/SC)*57.2957795                                    0400
      IF (SS) 3,4,5                                                     0410
    3 IF (SC) 6, 7, 7                                                   0420
    6 AZ(I) = AZ(I) + 180.0
      GØ TØ 4
    7 AZ(I) = AZ(I) + 360.0
      GØ TØ 4
    5 IF (SC) 8, 4, 4
    8 AZ(I) = AZ(I) + 180.0
    4 SS = ((A-D1)**2 + (B-E1)**2 + C**2 - 2.0)
      SC = ((A-G1)**2 + (B-H1)**2 + (C-F1)**2-2.0)
      AZINV(I) = ATAN(SS/SC) *57.2957795
      IF (SS) 13, 14, 15
   13 IF (SC) 16, 17, 17
   16 AZINV(I) = AZINV(I) + 180.0
      GØ TØ 14
   17 AZINV(I) = AZINV(I) + 360.0
      GØ TØ 14
   15 IF (SC) 18, 14, 14
   18 AZINV(I) = AZINV(I) + 180.0
   14 EL = 6.72267002/.993277329E+03
      EC = .672267002E-02
      E1 = 1.0+ EL
      AL = TAN(TH(I))/(     E1*TAN(TH(K))) + EC    *SQRT((E1+(TAN(TH (I)))
     1**2)/(E1 +(TAN(TH(K)))**2))
      DL = PHI(I) - PHI(K)
      A12 = ATAN(SIN(DL)/( (AL -CØS(DL))*SIN(TH(K))))
      EØ = EL*((CØS(TH(K)) *CØS(A12))**2 +(SIN(TH(K)))**2)
      EØ2 = EØ**2
      EØ3 = EØ**3
      CØ = 1.0+ EØ/4.0- 3.0*EØ2/64.0+ 5.0*EØ3/256.0
      C2 = -EØ/8.0+ EØ2/32.0-15.0*EØ3/1024.0
      C4 = -EØ2/256.0+ 3.0*EØ3/1024.0
      TH2 = TH(K)*2.0
      TH2I = TH(I)*2.0
      V1=EXP(.230259   E+01*(.380544   E+01-(.732368 E-3)*CØS(TH2)
     1  +(.6175 E-6)*CØS(2.0*TH2) -(.7E-9)*CØS(3.0*TH2) ))
      V2 = EXP(.230259   E+01*(.380544   E+01-(.732368 E-3)*CØS(TH2I)
     1  +(.6175E-6)*CØS(2.0*TH2I) -(.7E-9)*CØS(3.0*TH2I)))
      Z1 = V1*(1.0-   EC)*SIN(TH(K))
      Z2 = V2*(1.0-   EC)*SIN(TH(I))
      X2 = V2*CØS(TH(I))*CØS(DL)
      Y2 = V2*CØS(TH(I))*SIN(DL)
      U1 = ATAN(TAN(TH(K))/(SQRT(1.0+EØ)*CØS(A12))      )
      U2 = ATAN((V1*SIN(TH(K)) + (1.0+ EØ)*(Z2-Z1))/(SQRT(1.0+EØ)*      (
     1X2*CØS(A12) - Y2*SIN(TH(K))*SIN(A12)))       )
      BØ = V1*SQRT(1.0+EL*(CØS(TH(K))*CØS(A12))**2)/(1.0+EØ)
      DIST(I)=BØ*(CØ*(U2-U1)+C2*(SIN(2.0*U2) -SIN(2.0*U1)) +C4*(SIN(4.0*
     1U2)- SIN(4.0*U1)) )
      DIST(I) = ABS(DIST(I))
      TEST = DIST(I) - 111.0*XDEG(I)
      IF  (ABS(TEST)-100.0)  25,301,301
  301 U2 = U2 + .314159265E-01
      DIST(I)=BØ*(CØ*(U2-U1)+C2*(SIN(2.0*U2) -SIN(2.0*U1)) +C4*(SIN(4.0*
     1U2)- SIN(4.0*U1)) )
   25  CØNTINUE
      DISDG=XDEG(I)
      DISKM=DIST(I)
      AZMTH=AZ(I)
      BAKAZ=AZINV(I)
C   BAKAZ IS IS THE AZZIMUTH FRØM PØINT BTØ A
      RETURN
      END
```

```
                          HEX     DEC                                  HEX     DEC                                  HEX     DEC
NAME   TYPE CLASS         LOC     WORDS      NAME   TYPE CLASS         LOC     WORDS      NAME   TYPE CLASS         LOC     WORDS
----   ---- -----       -------   -----      ----   ---- -----       -------   -----      ----   ---- -----       -------   -----
A         R SCALR       00014 V       1      ABS       R SPROG       INTRIN               AL        R SCALR       00026 V       1
ALAT      R SCALR      *0003B V   DUMMY      ALON      R SCALR      *0003C V   DUMMY      ATAN      R SPROG       INTRIN
AZ        R ARRAY       00009 V       2      AZINV     R ARRAY       0000B V       2      AZMTH     R SCALR      *00040 V   DUMMY
A1        R SCALR       0001D V       1      A12       R SCALR       00028 V       1      B         R SCALR       00015 V       1
BAKAZ     R SCALR      *00041 V   DUMMY      BLAT      R SCALR      *0003D V   DUMMY      BLON      R SCALR      *0003E V   DUMMY
B0        R SCALR       00039 V       1      B1        R SCALR       0001E V       1      C         R SCALR       00016 V       1
C0        R SCALR       0002C V       1      COS       R SPROG       INTRIN               C1        R SCALR       0001C V       1
C2        R SCALR       0002D V       1      C4        R SCALR       0002E V       1      D         R SCALR       00011 V       1
DISAZ       SPROG       00000 P              DISAZ     R SCALR       00000 V       1      DISDG     R SCALR      *00043 V   DUMMY
DISKM     R SCALR      *00042 V   DUMMY      DIST      R ARRAY       00007 V       2      DL        R SCALR       00027 V       1
D1        R SCALR       00019 V       1      E         R SCALR       00012 V       1      EC        R SCALR       00025 V       1
EL        R SCALR       00024 V       1      E0        R SCALR       00029 V       1      E02       R SCALR       0002A V       1
E03       R SCALR       0002B V       1      EXP       R SPROG       INTRIN               E1        R SCALR       0001A V       1
F         R SCALR       00013 V       1      F1        R SCALR       0001B V       1      G         R SCALR       00017 V       1
G1        R SCALR       0001F V       1      H         R SCALR       00018 V       1      H1        R SCALR       00020 V       1
I         I SCALR       0000D V       1      IFRC      I SCALR      *0003F V   DUMMY      J         I SCALR       0000F V       1
K         I SCALR       0000E V       1      PHI       R ARRAY       00003 V       2      SC        R SCALR       00021 V       1
SD        R SCALR       00022 V       1      SIN       R SPROG       INTRIN               SQRT      R SPROG       INTRIN
SS        R SCALR       00023 V       1      TAN       R SPROG       0000D P              TEST      R SCALR       0003A V       1
TH        R ARRAY       00001 V       2      THETA     R SCALR      *00044 V   DUMMY      THETA     R UNUSED
THG       R SCALR       00010 V       1      TH2       R SCALR       0002F V       1      TH2I      R SCALR       00030 V       1
U1        R SCALR       00037 V       1      U2        R SCALR       00038 V       1      V1        R SCALR       00031 V       1
V2        R SCALR       00032 V       1      XDEG      R ARRAY       00005 V       2      X2        R SCALR       00035 V       1
Y2        R SCALR       00036 V       1      Z1        R SCALR       00033 V       1      Z2        R SCALR       00034 V       1

        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LOC       LABEL    LOC       LABEL    LOC       LABEL    LOC       LABEL    LOC       LABEL    LOC
-----  -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
    1  000BC          2   000B4          3   000DA          4   000EC          5   000E6          6   000DC
    7  000E1          8   000E8         13   00112         14   00124         15   0011E         16   00114
   17  00119         18   00120         25   0027E         30   00030         31   00025         32   0002B
  301  0025F

LOCAL VARIABLES (59 WORDS)!

   00000 DISAZ     00001 TH      00003 PHI     00005 XDEG    00007 DIST    00009 AZ
   0000B AZINV     0000D I       0000E K       0000F J       00010 THG     00011 D
   00012 E         00013 F       00014 A       00015 B       00016 C       00017 G
   00018 H         00019 D1      0001A E1      0001B F1      0001C C1      0001D A1
   0001E B1        0001F G1      00020 H1      00021 SC      00022 SD      00023 SS
   00024 EL        00025 EC      00026 AL      00027 DL      00028 A12     00029 E0
   0002A E02       0002B E03     0002C C0      0002D C2      0002E C4      0002F TH2
   0003C TH2I      00031 V1      00032 V2      00033 Z1      00034 Z2      00035 X2
   00036 Y2        00037 U1      00038 U2      00039 B0      0003A TEST

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 DISAZ
```

```
LOCAL SUBPROGRAMS DEFINED:

   0000D TAN

INTRINSIC SUBPROGRAMS USED:

   ABS         ATAN        COS         EXP         SIN         SQRT

EXTERNAL SUBPROGRAMS REQUIRED:

   9ATAN1      9COS        9EXP        9SETLFN     9SETUP1     9SIN        9SQRT

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                        DEC        HEX
                       WORDS      WORDS
                       -----      -----
  GENERATED CODE:       651       0028B
       CONSTANTS:        28       0001C
 LOCAL VARIABLES:        59       0003B
           TEMPS:        20       00014
                       -----      -----
   TOTAL PROGRAM:       758       002F6
```

```
      FUNCTION DMTOR (KD, AM)
C          FUNCTION TO CONVERT DEGREES AND MINUTES TO RADIANS
C
C
C     NOTE:  IF BOTH KD AND AM DO NOT HAVE SAME SIGN AND
C     KD IS NOT 0, THEN RADIANS WILL BE WRONG
C
C
      DMTOR = KD
      A = DMTOR + (AM/60.0)
      DMTOR = A * 1.745329E-2
      RETURN
      END
```

```
                    HEX    DEC                                HEX    DEC                                HEX    DEC
NAME  TYPE CLASS    LØC    WØRDS       NAME  TYPE CLASS       LØC    WØRDS       NAME   TYPE CLASS     LØC    WØRDS
----  ---- -----  -------  -----       ----  ---- -----     -------  -----       ----   ---- -----   -------  -----
A        R SCALR   00001 V     1       AM       R SCALR   *00003 V DUMMY       DMTØR     R SPRØG   00000 P
DMTØR    R SCALR   00000 V     1       KD       I SCALR   *00002 V DUMMY

LØCAL VARIABLES (2 WØRDS):

   00000 DMTØR      00001 A

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 DMTØR

EXTERNAL SUBPRØGRAMS REQUIRED:

   9ITØR      9SETUP2

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                   DEC       HEX
                   WØRDS     WØRDS
                   -----     -----
 GENERATED CØDE:     16      0001C
      CØNSTANTS:      2      00002
LØCAL VARIABLES:      2      00002
          TEMPS:      3      00003
                   -----     -----
  TØTAL PRØGRAM:     23      00017
```

```
      SUBRØUTINE CNAV(DLAT,KSN,DLØN,KWE,RLAT,RLØNG,KK)
C   VERSIØN 3 FEB 1974,  CØRRECT KEYPUNCH ERRØR
C SUBRØUTINE CNAV, CØNVERTS ANØTATED DECIMAL DEGREES TØ RADIANS
C                        IF KK=0
C                      CØNVERTS RADIANS TØ ANØTATED DECIMAL DEGREES
C                        IF KK=-1
C
C    ANØTATIØN IS  N,S, W, ØR E.
C
      DEGRA = 1.745329E-2
      RADEG = 57.29578
      JN=1HN
      JS=1HS
      JE=1HE
      JW=1HW
      IF(KK) 100,50,50
C CØNVERT DECIMAL DEGREES TØ RADIANS
   50 RLAT=DLAT*DEGRA
      RLØNG=DLØN*DEGRA
      IF(KSN-JS)75,70,75
C SØUTH LATITUDE
   70 RLAT=-RLAT
    75 IF(KWE-JW)85,80,85
C WEST LØNGITUDE
   80 RLØNG= -RLØNG
   85 CØNTINUE
      RETURN
C CØNVERT RADIANS TØ ANØTATED DECIMAL DEGREES
  100 ALAT= ABS(RLAT)
      ALØNG= ABS(RLØNG)
      DLAT= ALAT*RADEG
      DLØN = ALØNG*RADEG
       IF(RLAT)430,432,432
  430 KSN=JS
      GØ TØ 435
  432 KSN=JN
  435 IF(RLØNG)440,442,442
  440 KWE=JW
      GØ TØ 445
  442 KWE=JE
  445 RETURN
      END
```

```
                         HEX     DEC                                HEX     DEC                                HEX     DEC
NAME   TYPE CLASS        LØC     WØRDS     NAME   TYPE CLASS        LØC     WØRDS     NAME   TYPE CLASS        LØC     WØRDS
----   ---- -----      ------- -----       ----   ---- -----      ------- -----       ----   ---- -----      ------- -----
ABS       R SPRØG      INTRIN              ALAT      R SCALR      0000B V       1     ALØNG     R SCALR      00009 V       1
DEGRA     R SCALR      00002 V       1     DLAT      R SCALR     *0000B V DUMMY       DLØN      R SCALR     *0000D V DUMMY
DNAV        SPRØG      00000 P             DNAV      R SCALR      00000 V       1     IFKK      I SCALR      00001 V       1
JE        I SCALR      00006 V       1     JN        I SCALR      00004 V       1     JS        I SCALR      00005 V       1
JW        I SCALR      00007 V       1     JWE       I SCALR      0000A V       1     KK        I SCALR     *00011 V DUMMY
KSN       I SCALR     *0000C V DUMMY       KWE       I SCALR     *0000E V DUMMY       RADEG     R SCALR      00003 V       1
RLAT      R SCALR     *0000F V DUMMY       RLØNG     R SCALR     *00010 V DUMMY


        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC
-----   -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
   50   0001A         70   00023         75   00026         80   00029         85   0002C        100   0002D
  430   00035        432   0003C        435   0003E        440   00040        442   00043        445   00045


LØCAL VARIABLES (11 WØRDS):

   00000 DNAV         00001 IFKK         00002 DEGRA        00003 RADEG        00004 JN           00005 JS
   00006 JE           00007 JW           00008 ALAT         00009 ALØNG        0000A JWE


BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 DNAV


INTRINSIC SUBPRØGRAMS USED:

   ABS


EXTERNAL SUBPRØGRAMS REQUIRED:

   9SETUPN


HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                       DEC      HEX
                       WØRDS    WØRDS
                       -----    -----
  GENERATED CØDE:        70     00046
       CØNSTANTS:         6     00006
 LØCAL VARIABLES:        11     0000B
           TEMPS:         8     00008
                       -----    -----
   TØTAL PRØGRAM:        95     0005F
```

```
      SUBRØUTINE DREC(VN,VE,RLAT,RLØNG,TDIF)
CC
C   THIS SUBRØUTINE TAKES A PØSITIØN (RLAT,RLØNG)
C   AND DR S USING VELØCITIES (VN,VE), AND TIME
C   DIFFERENCE (TDIF IN HØURS) TØ A NEW PØSITIØN
C   WHICH IS STØRED IN (RLAT,RLØNG)
C   WRITTEN BY A. FØLINSBEE
C   USES:  REARH
      R = REARH(RLAT)
      SPEDK = .5144444
      TSEC = TDIF*3600.
      RLAT = RLAT+(VN*SPEDK*TSEC/R)
      BLAT = ABS(RLAT)
      RLØNG = RLØNG+VE*SPEDK*TSEC/(R*CØS(BLAT))
      RETURN
      END
```

```
                        HEX    DEC                            HEX    DEC                             HEX    DEC
NAME  TYPE CLASS       LØC    WØRDS    NAME  TYPE CLASS       LØC    WØRDS    NAME  TYPE CLASS       LØC    WØRDS
----  ---- -----     ------- -----     ----  ---- -----     ------- -----     ----  ---- -----     ------- -----
ABS      R SPRØG     INTRIN            BLAT     R SCALR     00004 V     1    CØS      R SPRØG     INTRIN
DREC     R SCALR     00000 V     1     DREC       SPRØG     00000 P          R        R SCALR     00001 V     1
REARH    R SPRØG     EXTERN            RLAT     R SCALR    *00007 V DUMMY    RLØNG    R SCALR    *00008 V DUMMY
SPECK    R SCALR     00002 V     1     TDIF     R SCALR    *00009 V DUMMY    TSEC     R SCALR     00003 V     1
VE       R SCALR    *00006 V DUMMY     VN       R SCALR    *00005 V DUMMY

LØCAL VARIABLES (5 WØRDS):

   00000 DREC        00001 R           00002 SPECK      00003 TSEC        00004 BLAT

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 DREC

INTRINSIC SUBPRØGRAMS USED:

   ABS        CØS

EXTERNAL SUBPRØGRAMS REQUIRED:

   REARH      9CØS       9SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC     HEX
                   WØRDS   WØRDS
                   -----   -----
 GENERATED CØDE:     36    00024
      CØNSTANTS:      2    00002
LØCAL VARIABLES:      5    00005
          TEMPS:      7    00007
                   -----   -----
  TØTAL PRØGRAM:     50    00032
```

```
                    HEX     DEC                          HEX     DEC                           HEX     DEC
NAME  TYPE CLASS    LØC     WØRDS     NAME  TYPE CLASS    LØC     WØRDS     NAME   TYPE CLASS    LØC     WØRDS
----  ---- -----  ------- -----       ----  ---- -----  ------- -----       ----   ---- -----  ------- -----
ABS      R SPRØG  INTRIN              BLAT     R SCALR  00004 V     1       CØS       R SPRØG  INTRIN
DREC     R SCALR  00000 V     1       DREC       SPRØG  00000 P             R         R SCALR  00001 V     1
REARH    R SPRØG  EXTERN              RLAT     R SCALR *00007 V DUMMY       RLØNG     R SCALR *00008 V DUMMY
SPECK    R SCALR  00002 V     1       TDIF     R SCALR *00009 V DUMMY       TSEC      R SCALR  00003 V     1
VE       R SCALR *00006 V DUMMY       VN       R SCALR *00005 V DUMMY

LØCAL VARIABLES (5 WØRDS):

   00000 DREC        00001 R          00002 SPECK      00003 TSEC       00004 BLAT

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 DREC

INTRINSIC SUBPRØGRAMS USED:

   ABS       CØS

EXTERNAL SUBPRØGRAMS REQUIRED:

   REARH     9CØS      9SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC     HEX
                     WØRDS   WØRDS
                     -----   -----
  GENERATED CØDE:      36    00024
       CØNSTANTS:       2    00002
 LØCAL VARIABLES:       5    00005
           TEMPS:       7    00007
                     -----   -----
   TØTAL PRØGRAM:      50    00032
```

```
       SUBRØUTINE DY2M(ID,IY,MØ,IDAY)
C  DY2M TAKES CØNSECUTIVE DAYS AND THE YEAR AND CHANGES THEM INTØ DAYS &MØNTHES
      DIMENSIØN MYDAY(13)
      DATA MYDAY/1,32,60,91,121,152,182,213,244,274,305,335,365/
C  DETERMINE IF LEAP YEAR
      A=IY
      B=IY/4
      A=A/4.0
      IF(A-B)  12,10,12
10    LEAP=1
       GØ TØ 13
12    LEAP=0
13    DØ 14 I=3,13
      MYDAY(I)=MYDAY(I)+LEAP
14    CØNTINUE
       DØ 15 I=1,12
      IF(MYDAY(I+1)-ID)  15,16,16
16    MØ=I
      IDAY=ID-MYDAY(I)+1
      GØ TØ 17
15    CØNTINUE
C   RETURN MØ=0 AND IDAY=0  IF ID GT 365+LEAP
      MØ=0
      IDAY=0
17    DØ 18 I=3,13
      MYDAY(I)=MYDAY(I)-LEAP
18    CØNTINUE
      RETURN
      END
```

```
                     HEX    DEC                             HEX    DEC                              HEX    DEC
NAME  TYPE CLASS     LØC    WØRDS    NAME  TYPE CLASS       LØC    WØRDS    NAME  TYPE CLASS       LØC    WØRDS
----  ---- -----  -------  -----    ----  ---- -----     -------  -----    ----  ---- -----     -------  -----
A        R SCALR   0000E V     1    B        R SCALR     0000F V     1    DY2M       SPRØG     00000 P
DY2M     R SCALR   00000 V     1    I        I SCALR     00011 V     1    ID       I SCALR    *00012 V DUMMY
IDAY     I SCALR  *00015 V DUMMY    IY       I SCALR    *00013 V DUMMY    LEAP     I SCALR     00010 V     1
MØ       I SCALR  *00014 V DUMMY    MYDAY    I ARRAY     00001 V    13

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC
-----  -----     -----  -----     -----  -----     -----  -----     -----  -----     -----  -----
   10  00014        12  00017        13  00019        14  0001E        15  0002F        16  00026
   17  00037        18  0003D

LØCAL VARIABLES (18 WØRDS):

   00000 DY2M       00001 MYDAY      0000E A          0000F B          00010 LEAP       00011 I

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 DY2M

EXTERNAL SUBPRØGRAMS REQUIRED:

   9ITØR      9SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC      HEX
                     WØRDS    WØRDS
                     -----    -----
 GENERATED CØDE:       64     0004C
      CØNSTANTS:        2     00002
LØCAL VARIABLES:       18     00012
          TEMPS:        5     00005
                     -----    -----
  TØTAL PRØGRAM:       89     00059
```

```
      SUBRØUTINE ENDLT(ICNT,DLATØ,DLABØ,DLØLE,DLØRI,IDL,ILI,IAR)
C           VERSIØN ØF 10 MAY 72
      ØUTPUT 'ENDLT ØF 10 MAY 72 '
      ØUTPUT DLATØ,DLABØ,DLØLE,DLØRI
C------
      DIMENSIØN IA(20),IB(5)
      DATA ITERI,IBL/'EITP','    '/
C ------
      IIN=105
      ICNT=1
      RADEG = 57.29578
C ------
      IF(IAR.EQ.0)GØTØ100
C
      CALL ARLIM(IIN,IIØUT,DLATØ,DLABØ,DLØLE,DLØRI)
      DLATØ = DLATØ*RADEG
      DLABØ = DLABØ*RADEG
      DLØLE = DLØLE*RADEG
      DLØRI = DLØRI*RADEG
C ------
  100 CØNTINUE
      ALATØP=DLATØ+90. ; LATØP=ALATØP
      ALABØT=DLABØ+90. ; LABØT=ALABØT
      ALØLE=DLØLE+180. ; LØLE=ALØLE
      ALØRI=DLØRI+180. ; LØRI=ALØRI
      LA101=LATØP/10 ; LA102=LABØT/10
      LØ101=LØLE/10  ; LØ102=LØRI/10
C
      DØ101I=LA101,LA102,-1
      DØ102J=LØ102,LØ101,-1
      DØ103K=9,0,-1
      DØ104L=9,0,-1
      LAC=I*10+K ; LØC=J*10+L
      IF((LAC.LT.LABØT).ØR.(LAC.GT.LATØP))GØTØ104
      IF((LØC.LT.LØLE).ØR.(LØC.GT.LØRI))GØTØ104
      WRITE(ILI,105)LAC,LØC
  105 FØRMAT(2I3)
  104 CØNTINUE
  103 CØNTINUE
  102 CØNTINUE
  101 CØNTINUE
C
    2 CØNTINUE
      READ(IIN,1)IA
    1 FØRMAT(20A4)
C ------
      IF(IA(1).EQ.ITERI)WRITE(IDL,12)(IA(I),I=1,5) ; GØTØ3
      IF(IA(1).EQ.IBL)ICNT=ICNT+1
     *                          ; WRITE(IDL,12)(IA(I),I=1,5) ; GØTØ2
C ------
      DØ10I=1,4
      IP=5*(I-1)+1
      IF(IA(IP).EQ.IBL)GØTØ10
      DØ11J=1,5
      IB(J)=IA(IP+J-1)
   11 CØNTINUE
      WRITE(IDL,12)IB
   12 FØRMAT(5A4)
   10 CØNTINUE
```

```
          GØTØ2
  C ------
        3 REWIND IDL ; REWIND ILI ; RETURN
          END
```

```
                       HEX     DEC                               HEX     DEC                               HEX     DEC
NAME    TYPE CLASS     LOC     WORDS      NAME    TYPE CLASS     LOC     WORDS      NAME    TYPE CLASS     LOC     WORDS
----    ---- -----   -------  -----       ----    ---- -----   -------  -----       ----    ---- -----   -------  -----
ALABOT     R SCALR   00021 V       1      ALATOF     R SCALR   0001F V       1      ALOLE      R SCALR   00023 V       1
ALORI      R SCALR   00025 V       1      ARLIM        SPROG   EXTERN               DLABO      R SCALR  *00034 V DUMMY
CLATO      R SCALR  *00033 V DUMMY        CLOLE      R SCALR  *00035 V DUMMY        DLORI      R SCALR  *00036 V DUMMY
ENCLT      R SCALR   00000 V       1      ENCLT        SPROG   00000 P              I          I SCALR   0002B V       1
IA         I ARRAY   00001 V      20      IAR        I SCALR  *00039 V DUMMY        IB         I ARRAY   00015 V       5
IBL        I SCALR   0001B V       1      ICNT       I SCALR  *00032 V DUMMY        IDL        I SCALR  *00037 V DUMMY
IIN        I SCALR   0001C V       1      IIOLT      I SCALR   0001E V       1      ILI        I SCALR  *00038 V DUMMY
IP         I SCALR   00031 V       1      ITERI      I SCALR   0001A V       1      J          I SCALR   0002C V       1
K          I SCALR   0002D V       1      L          I SCALR   0002E V       1      LABOT      I SCALR   00022 V       1
LAC        I SCALR   0002F V       1      LATOP      I SCALR   00020 V       1      LA101      I SCALR   00027 V       1
LA102      I SCALR   00028 V       1      LOC        I SCALR   00030 V       1      LOLE       I SCALR   00024 V       1
LORI       I SCALR   00026 V       1      LO101      I SCALR   00029 V       1      LO102      I SCALR   0002A V       1
RADEG      R SCALR   0001D V       1

        HEX            HEX            HEX            HEX            HEX            HEX
LABEL   LOC    LABEL   LOC    LABEL   LOC    LABEL   LOC    LABEL   LOC    LABEL   LOC
-----  -----   -----  -----   -----  -----   -----  -----   -----  -----   -----  -----
    1  000AC       2  000A6       3  000F5      10  000F0      11  000E5      12  000ED
  100  00049     101  000A2     102  0009E     103  0009B     104  00094     105  00091

LOCAL VARIABLES (50 WORDS):

   00000 ENCLT     00001 IA        00015 IB        0001A ITERI     0001B IBL       0001C IIN
   0001D RADEG     0001E IIOUT     0001F ALATOP    0002C LATOP     00021 ALABOT    00022 LABOT
   00023 ALOLE     00024 LOLE      00025 ALORI     00026 LORI      00027 LA101     00028 LA102
   00029 LO101     0002A LO102     0002B I         0002C J         0002D K         0002E L
   0002F LAC       00030 LOC       00031 IP

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 ENCLT

EXTERNAL SUBPROGRAMS REQUIRED:

   ARLIM     F:101     F:102     F:103     F:104     F:105     F:106     F:108
   9BCDREAD  9BCDWRIT  9ENDIOL   9IODATA   9IOLUSA   9PRINT    9REWIND   9RTOI
   9SETLFN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                      DEC      HEX
                     WORDS    WORDS
                     -----    -----
  GENERATED CODE:     250     000FA
       CONSTANTS:       4     00004
 LOCAL VARIABLES:      50     00032
           TEMPS:       9     00009
                     -----    -----
   TOTAL PROGRAM:     313     00139
```

```
      SUBROUTINE EVIL (JIOUT,I,IBAD,KDA,KMO,KYR,KHM)
C  SUBROUTINE EVIL, CHECKS STATUS INDICATOR, WRITES ERROR MESSAGES,
C                     AND RETURNS INDICATOR FOR BAD READS(IBAD)
C  IBAD=0, ALL OK
CC
CC
      IBAD=0
      GO TO (110,120,130,140,150,160),I
  120 WRITE(JIOUT,122)KDA,KMO,KYR,KHM
  122 FORMAT('EOF FOUND',3I3,I5)
CS    PAUSE 122
      IBAD=2
      GO TO 110
  130 WRITE(JIOUT,132)KDA,KMO,KYR,KHM
  132 FORMAT('EOT FOUND',3I3,I5)
CS    PAUSE 132
      IBAD=2
      GO TO 110
  140 WRITE(JIOUT,142)KDA,KMO,KYR,KHM
  142 FORMAT('PARITY ER',3I3,I5)
      IBAD=-1
      GO TO 110
  150 WRITE(JIOUT,152)KDA,KMO,KYR,KHM
  152 FORMAT('FMT ER',3I3,I5)
      IBAD=-1
      GO TO 110
  160 WRITE(JIOUT,162)I,KDA,KMO,KYR,KHM
  162 FORMAT('ER I=',I2,3I3,I5)
      IBAD=-1
  110 RETURN
     END
```

```
                       HEX    DEC                         HEX    DEC                           HEX    DEC
NAME  TYPE CLASS       LOC    WORDS   NAME  TYPE CLASS    LOC    WORDS   NAME  TYPE CLASS      LOC    WORDS
----  ---- -----     ------- -----    ----  ---- -----  ------- -----    ----  ---- -----    ------- -----
EVIL       SPROG      00000 F         EVIL     R SCALR  00000 V     1    I        I SCALR  *00002 V DUMMY
IBAC     I SCALR     *00003 V DUMMY   JIOLT    I SCALR *00001 V DUMMY    KDA      I SCALR  *00004 V DUMMY
KMM      I SCALR     *00007 V DUMMY   KMO      I SCALR *00005 V DUMMY    KYR      I SCALR  *00006 V DUMMY

        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LOC        LABEL   LOC        LABEL   LOC        LABEL   LOC        LABEL   LOC        LABEL   LOC
-----  -----       -----  -----       -----  -----       -----  -----       -----  -----       -----  -----
  110  0006C         120  00017         122  0001F         130  00028         132  00030         140  00039
  142  00041         150  0004A         152  00052         160  0005B         162  00064

LOCAL VARIABLES (1 WORD):

   00000 EVIL

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 EVIL

EXTERNAL SUBPROGRAMS REQUIRED:

   F:102      F:104      F:106      F:108      9BCDWRIT    9IODATA    9SETUPN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                    DEC      HEX
                   WORDS    WORDS
                   -----    -----
  GENERATED CODE:    109    0006D
       CONSTANTS:      0    00000
 LOCAL VARIABLES:      1    00001
           TEMPS:      8    00008
                   -----    -----
   TOTAL PROGRAM:    118    00076
```

```
      SUBROUTINE EXTD (CX, CXP, CY, CYP, BX, BY, IND)
C
C
      IND = 0
      D = ((CX - CXP)**2) + ((CY - CYP)**2)
      A = ((CX - BX)**2) + ((CY - BY)**2)
      B = ((CXP - BX)**2) + ((CYP - BY)**2)
      IF (A - D) 20, 20, 10
   10 IND = 1
      RETURN
   20 IF (B - D) 30, 30, 25
   25 IND = 1
   30 RETURN
      END
```

```
                    HEX     DEC                                HEX     DEC                                HEX     DEC
NAME  TYPE CLASS    LØC     WØRDS     NAME  TYPE CLASS    LØC     WØRDS     NAME  TYPE CLASS    LØC     WØRDS
----  ---- -----  -------  -----      ----  ---- -----  -------  -----      ----  ---- -----  -------  -----
A        R SCALR   00002 V      1     B        R SCALR   00003 V      1     BX       R SCALR *00008 V DUMMY
BY       R SCALR  *00009 V  DUMMY     CX       R SCALR  *00004 V  DUMMY     CXP      R SCALR *00005 V DUMMY
CY       R SCALR  *00006 V  DUMMY     CYP      R SCALR  *00007 V  DUMMY     D        R SCALR  00001 V     1
EXTC     R SCALR   00000 V      1     EXTC       SPRØG   00000 P            IND      I SCALR *0000A V DUMMY

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC
-----  -----     -----  -----     -----  -----     -----  -----     -----  -----     -----  -----
   1C  0002A        2C  0002C        25  0003C        30  00032

LØCAL VARIABLES (4 WØRDS):

   00000 EXTC       00001 D          00002 A          00003 B

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 EXTC

EXTERNAL SUBPRØGRAMS REQUIRED:

   $SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC      HEX
                    WØRDS .  WØRDS
                    -----    -----
  GENERATED CØDE:     51     00033
       CØNSTANTS:      0     00000
 LØCAL VARIABLES:      4     00004
           TEMPS:      9     00009
                    -----    -----
   TØTAL PRØGRAM:     64     0004C
```

```
      SUBRØUTINE FIND(LIMDA,LIMMØ,LIMYR,LIMHM,
     1   INDA,INMØ,INYR,INHM,INDIC)
C
C  INDICATES WHETHER INPUT DATE <,=,> LIMIT DATE
C  NØ CØMMØN REQUIRED
C  LIMDA,LIMMØ,LIMYR,LIMHM ARE LIMIT DAY,MØNTH ,YEAR,TIME
C  INDA,INMØ,INYR,INHM ARE INPUT DAY,MØNTH,YEAR,TIME
C  INDIC IS INDICATØR
C
C  IF LIMYR = 99, NØ CØMPARISØN IS MADE
C  IF LIMMØ = 99, ØNLY YEARS ARE CØMPARED
C  IF LIMDA = 99, ØNLY YEARS AND MØNTHS ARE CØMPARED
C  IF LIMHM = 9999, DATES ARE CØMPARED BUT TIMES ARE IGNØRED
C  NØTE: ALL FØUR LIMITS SHØULD BE GIVEN
C
C  INDICATØR SETTINGS:
C    INDIC = -1 MEANS INPUT DATE IS BEFØRE LIMIT DATE
C    INDIC =  0 MEANS INPUT DATE IS EQUAL TØ LIMIT DATE
C    INDIC = +1 MEANS INPUT DATE IS AFTER LIMIT DATE
C
      IF(LIMYR-99)100,300,100
  100 IF(INYR-LIMYR)199,101,201
  101 IF(LIMMØ-99)102,200,102
  102 IF(INMØ-LIMMØ)199,103,201
  103 IF(LIMDA-99)104,200,104
  104 IF(INDA-LIMDA)199,105,201
  105 IF(LIMHM-9999)106,200,106
  106 IF(INHM-LIMHM)199,200,201
  199 INDIC = -1
      RETURN
  200 INDIC = 0
      RETURN
  201 INDIC = +1
  300 RETURN
      END
```

```
                       HEX      DEC                              HEX      DEC                              HEX      DEC
NAME  TYPE CLASS       LOC      WORDS     NAME  TYPE CLASS       LOC      WORDS     NAME  TYPE CLASS       LOC      WORDS
----  ---- -----     -------    -----     ----  ---- -----     -------    -----     ----  ---- -----     -------    -----
FIND       SPROG      00000 P             FIND     R SCALR    00000 V        1      INDA     I SCALR   *00005 V  DUMMY
INDIC    I SCALR     *00009 V  DUMMY      INHM     I SCALR   *00008 V  DUMMY      INMB     I SCALR   *00006 V  DUMMY
INYR     I SCALR     *00007 V  DUMMY      LIMCA    I SCALR   *00001 V  DUMMY      LIMHM    I SCALR   *00004 V  DUMMY
LIMMB    I SCALR     *00002 V  DUMMY      LIMYR    I SCALR   *00003 V  DUMMY

         HEX                 HEX                 HEX                 HEX                 HEX                 HEX
LABEL    LOC       LABEL     LOC       LABEL     LOC       LABEL     LOC       LABEL     LOC       LABEL     LOC
-----   -----      -----    -----      -----    -----      -----    -----      -----    -----      -----    -----
  100   0000F        101    00013        102    00016        103    0001A        104    0001D        105    00021
  106   00024        199    00028        200    0002B        201    0002E        300    00030

LOCAL VARIABLES (1 WORD):

   0000C FIND

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 FIND

EXTERNAL SUBPROGRAMS REQUIRED:

   $SETUP

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                    DEC       HEX
                   WORDS     WORDS
                   -----     -----
  GENERATED CODE:     49     00031
       CONSTANTS:      0     00000
 LOCAL VARIABLES:      1     00001
           TEMPS:     10     0000A
                   -----     -----
   TOTAL PROGRAM:     60     0003C
```

```
          SUBRØUTINE FLD2(KK,ITAPE,RLAT,RLØNG,REG)
C          VERSIØN 6 MAY 1974
C            TØ IMPLEMENT MØDIFICATIØNS BY FØLIMSBEE ØF 24 APRIL 73
C
C     SUBRØUTINE FLD2, CALCULATES REGIØNAL FREE-AIR
C           ANØMALIES FRØM SPHERICAL HARMØNIC CØEFICIENTS
C            ENTERED AT RUN TIME
C
C
          DIMENSIØN S(25,25),C(25,25),BAR(25,25),F(25,25),SP(25)
          DIMENSIØN CP(25),FM(25),FN(25)
C
C      SSW(4)  UP TØ LIST INTERMEDIATE VALUES
C          SSW(5) UP TØ LIST BN,BV
C
C     TØ CHANGE ØRDER ØF CØEFFICIENTS REPLACE DIMENSIØN
C            STATEMENTS BY ØRDER + 1, AND SET NDIM=ØRDER + 1
C
C          A BLANK CARD MUST FØLLØW CØEFFS TØ INDICATE THEIR CØNPLETIØN
C
C
C      KK=0 FØR INITIAL ENTRY TØ FLD2
C      KK=1 HENCEFØRTH
C
C         USES F4LIBS FLØAT, SQRT, SIN, CØS, ATAN
C
          IF(KK)500,999,500
  999     CØNTINUE
          NDIM=25
          IIN = 105
          IIØUT = 108
          REFG=980000.0
          ØUTPUT 'FLD2'
          WRITE(IIØUT,1)
  1       FØRMAT('0 N    M      C(N,M)   S(N,M)'  )
          ISET=0
          MAXN=0
     22   DØ 324 N=1,NDIM
          DØ 324 M=1,N
          C(N,M)=0.
          S(N,M)=0.
    324   CØNTINUE
    325   CØNTINUE
          READ(ITAPE,302,END=30) N,M,CTEMP,STEMP
          IF(N) 30,30,25
    302   FØRMAT (I2,2X,I2,2X,E11.4,2X,E11.4)
     25   C(N+1,M+1)=CTEMP
          S(N+1,M+1)=STEMP
          WRITE(IIØUT,3) N,M,C(N+1,M+1),S(N+1,M+1)
    3     FØRMAT(1X,I5,I5,2E11.4)
     55   IF(N-MAXN)325,325,26
     26   MAXN=N
          GØ TØ 325
     30   CØNTINUE
C         NDIM SHØULD BE SAME AS SIZE ØF DIMENSIØNED ARRAYS
          MAX1=MAXN+1
CCCC      ISET=0 INDICATES FIRST CALL TØ PRØGRAM
C         RENØRMALIZE CØEF IF THIS IS FIRST CALL
          IF (ISET) 500,2,500
    2 CØNTINUE
      ISET=1
      DØ 17 N=1,NDIM
      DØ 17 M=2,NDIM
      P(N,M)=1.0
   17 CØNTINUE
      BAR(1,1)=-1.0
      DØ 20 N=2,NDIM
      FN(N)=N
      FM(N)=N-1
      BAR(N,1)=BAR(N-1,1)*FLØAT(2*N-3)/FLØAT(N-1)
      JT=2
      DØ 20 M=2,N
      BAR(N,M)=BAR(N,M-1)*SQRT(FLØAT((N-M+1)*JT)/FLØAT(N+M-2))
C
C     BAR(N,M) ARE FACTORS TØ RENØRMALIZE C,S
C
      JT=1
   20 CØNTINUE
      DØ 21 N=2,MAX1
      DØ 21 M=1,N
      C(N,M)=C(N,M)*BAR(N,M)*SQRT(FLØAT(2*N-1))
      S(N,M)=S(N,M)*BAR(N,M)*SQRT(FLØAT(2*N-1))
   21 CØNTINUE
C
C    NØW FINISHED WITH BAR, WILL USE LATER TØ STØRE CØNST FØR
C    RECURSIØN RELATIØN
      P(1,1)=1.
      SP(1)=0.
      CP(1)=1.
      RAD=.572957795E+02
      A=6378.388
      FLAT=1.0-1.0/297.
      A2=A**2
      A4=A**4
      B2=(A*FLAT)**2
      A2B2=A2*(1.-FLAT**2)
      A4B4=A4*(1.-FLAT**4)
      BAR(2,1)=0.
      BAR(2,2)=0.
      DØ 24 N=3,NDIM
      DØ 24 M=1,N
      BAR(N,M)=FLØAT((N-2)**2-(M-1)**2)/FLØAT((2*N-3)*(2*N-5))
C
   24 CØNTINUE
      RETURN
C     WE HAVE NØW SET UP MØST CØNSTANTS ARRAYS,ETC.
C     THE PRØGRAM CØMES TØ THIS PØINT IF IT HAS BEEN ENTERED
C     PREVIØUSLY
C
  500 SINLA = SIN(RLAT)
      CP(2)=CØS(RLØNG)
      SP(2)=SIN(RLØNG)
      DØ 51 M=3,MAX1
      SP(M)=SP(2)*CP(M-1)+CP(2)*SP(M-1)
      CP(M)=CP(2)*CP(M-1)-SP(2)*SP(M-1)
   51 CØNTINUE
      SNLA2=SINLA**2
      DEN2=A2-A2B2*SNLA2
      DEN=SQRT(DEN2)
      FAC=B2/A2
      THETA=ATAN(FAC*SINLA/(1.E-30+SQRT(1.-SNLA2)))
      R=SQRT((A4-A4B4*SNLA2)/DEN2)
      CT=SIN(THETA)
      ST = CØS(THETA)
      AØR=1.0
      AR=AØR**2
      BV=0.
      DØ 54 N=2,MAX1
      AR=AØR*AR
      DØ 54 M=1,N
      IF(N-M) 112,111,112
 111  F(N,N)=ST*F(N-1,N-1)
      GØ TØ 113
 112  IF (N-2) 2011,2012,2011
2012  GP=1.
      GØ TØ 2010
2011  GP=F(N-2,M)
2010   F(N,M)=CT*F(N-1,M)-BAR(N,M)*GP
 113  FNM=F(N,M)*AR
      TEMP=C(N,M)*CP(M)+S(N,M)*SP(M)
      BV=BV+TEMP*FLØAT(N-2)*FNM
  54  CØNTINUE
      REG=-BV
      REG=REG*REFG
      IF(ISW(5)) 306,306,403
 403  WRITE(IIØUT,405)BV,CØSD
 405  FØRMAT('BV=',E11.4,2X,'CØSD=',F6.3)
 306  RETURN
      END
```

```
                         HEX     DEC                               HEX     DEC                               HEX     DEC
NAME   TYPE CLASS        LOC     WORDS    NAME   TYPE CLASS        LOC     WORDS    NAME   TYPE CLASS        LOC     WORDS
----   ---- -----      --------  -----    ----   ---- -----      --------  -----    ----   ---- -----      --------  -----
A         R SCALR       00A36 V      1    ABR       R SCALR       00A46 V      1    AR        R SCALR       00A47 V      1
ATAN      R SPROG       INTRIN            A2        R SCALR       00A38 V      1    A2B2      R SCALR       00A3B V      1
A4        R SCALR       00A39 V      1    A4B4      R SCALR       00A3C V      1    BAR       R ARRAY       004E3 V    625
BV        R SCALR       00A48 V      1    B2        R SCALR       00A3A V      1    C         R ARRAY       00272 V    625
COS       R SPROG       INTRIN            COSC      R SCALR       00A4C V      1    CP        R ARRAY       009DE V     25
CT        R SCALR       00A44 V      1    CTEMP     R SCALR       00A31 V      1    DEN       R SCALR       00A40 V      1
DEN2      R SCALR       00A3F V      1    FAC       R SCALR       00A41 V      1    FLAT      R SCALR       00A37 V      1
FL02      R SCALR       00000 V      1    FL02        SPROG       00000 P           FLOAT     R SPROG       INTRIN
FM        R ARRAY       009F7 V     25    FN        R ARRAY       00A1C V     25    GP        R SCALR       00A49 V      1
IIN       I SCALR       00A2A V      1    IIOUT     I SCALR       00A2B V      1    ISET      I SCALR       00A2D V      1
ISW       I SPROG       EXTERN            ITAPE     I SCALR      *00A4E V  DUMMY    JT        I SCALR       00A34 V      1
KK        I SCALR      *00A4D V  DUMMY    M         I SCALR       00A30 V      1    MAXN      I SCALR       00A2E V      1
MAX1      I SCALR       00A33 V      1    N         I SCALR       00A2F V      1    NDIM      I SCALR       00A29 V      1
P         R ARRAY       00754 V    625    PNM       R SCALR       00A4A V      1    R         R SCALR       00A43 V      1
RAD       R SCALR       00A35 V      1    REFG      R SCALR       00A2C V      1    REG       R SCALR      *00A51 V  DUMMY
RLAT      R SCALR      *00A4F V  DUMMY    RLONG     R SCALR      *00A50 V  DUMMY    S         R ARRAY       00001 V    625
SIN       R SPROG       INTRIN            SINLA     R SCALR       00A3D V      1    SNLA2     R SCALR       00A3E V      1
SP        R ARRAY       009C5 V     25    SQRT      R SPROG       INTRIN            ST        R SCALR       00A45 V      1
STEMP     R SCALR       00A32 V      1    TEMP      R SCALR       00A4B V      1    THETA     R SCALR       00A42 V      1

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC
-----  -----     -----  -----     -----  -----     -----  -----     -----  -----     -----  -----
    1  0001D         2  0007E         3  0006D        17  00089        20  000BE        21  000DE
   22  0002B        24  0012E        25  00053        26  00076        30  00079        51  00150
   54  001BB        55  00073       111  0018A       112  00191       113  001A6       302  0004B
  306  001DE       324  00036       325  0003E       403  001CF       405  001D5       500  00137
  999  0000A      2010  0019C      2011  00197      2012  00194

LOCAL VARIABLES (2637 WORDS):

   00000 FL02        00001 S          00272 C          004E3 BAR        00754 P          009C5 SP
   009DE CP          009F7 FM         00A1C FN         00A29 NDIM       00A2A IIN        00A2B IIOUT
   00A2C REFG        00A2D ISET       00A2E MAXN       00A2F N          00A30 M          00A31 CTEMP
   00A32 STEMP       00A33 MAX1       00A34 JT         00A35 RAD        00A36 A          00A37 FLAT
   00A38 A2          00A39 A4         00A3A B2         00A3B A2B2       00A3C A4B4       00A3D SINLA
   00A3E SNLA2       00A3F DEN2       00A40 DEN        00A41 FAC        00A42 THETA      00A43 R
   00A44 CT          00A45 ST         00A46 ABR        00A47 AR         00A48 BV         00A49 GP
   00A4A PNM         00A4B TEMP       00A4C COSC

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 FL02

INTRINSIC SUBPROGRAMS USED:

   ATAN       COS        FLOAT       SIN        SQRT
```

```
EXTERNAL SUBPRØGRAMS REQUIRED:

   ISW            F:101        F:102        F:103        F:104        F:105        F:106        F:107
   9ATAN1         9BCDRDEE     9BCDWRIT     9CØS         9ENDIØL      9IØDATA      9ITØR        9PRI..
   9PWRRI         9SETLUN      9SIN         9SQRT

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC        HEX
                    WØRDS      WØRDS
                    -----      -----
  GENERATED CØDE:    479       001DF
       CØNSTANTS:      8       00008
 LØCAL VARIABLES:   2637       00A4D
           TEMPS:      9       00009
                    -----      -----
   TØTAL PRØGRAM:   3133       00C3D
```

```
      SUBRØUTINE GETC(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,RLAT,
     1RLØNG,KGDA,KGMØ,KGYR,KGHM,IEØD)
C
C     SUBRØUTINE GETC,FØR READING MAGNETICS AT CALCM FØRMAT
CHANGED 17 JUNE 1971 BY CM WØØDING TØ ANNØTATE ØBS MAG
C
      DIMENSIØN PLT(7)
      IEØD=0
      IIØUT=108
   14 CALL ENDIØ
   15 READ(ITAPE,16)KGYR,KGDA,KGMØ,KGHM,DLAT,DLØNG,DATA,B,FLD,DIS,DIR,
     1SPD
   16 FØRMAT(11X,I2,1X,2I2,1X,F6.1,F7.3,F8.3,1X,2F6.0,F5.0,3X,F7.1,1X,
     1F3.0,F4.1)
      CALL STAT(I)
      CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)
      IF(IBAD)14,30,65
   65 IEØD=1
      RETURN
   30 RLAT=DLAT*(1.0/57.29578)
      RLØNG=DLØNG*(1.0/57.29578)
      PLT(1)=KGHM
      PLT(2)=B
      PLT(3)=FLD
      PLT(4)=DIS
      PLT(5)=DIR
      PLT(6)=SPD
      PLT(7)=DATA
      KGDAØ=KGDA
      KGMØØ=KGMØ
      KGYRØ=KGYR
      KGHMØ=KGHM
C     SELECT  PØINT TØ BE PLØTTED
      IF(NX)110,120,110
  110 DATAX=PLT(NX)
  120 DATAY=PLT(NY)
      DATAZ=PLT(NZ)
      DATAW=PLT(NW)
      RETURN
       END
```

```
                      HEX     DEC                             HEX     DEC                             HEX     DEC
NAME  TYPE CLASS      LØC     WØRDS      NAME  TYPE CLASS      LØC     WØRDS      NAME  TYPE CLASS      LØC     WØRDS
----  ---- -----   -------- -----      ----  ---- -----   -------- -----      ----  ---- -----   -------- -----
B        R SCALR    00000 V     1      DATA     R SCALR    0000B V     1      DATAW    R SCALR  *0001F V DUMMY
DATAX    R SCALR   *0001C V DUMMY      DATAY    R SCALR   *0001D V DUMMY      DATAZ    R SCALR  *0001E V DUMMY
DIR      R SCALR    0000F V     1      DIS      R SCALR    0000E V     1      DLAT     R SCALR   00009 V     1
DLØNG    R SCALR    0000A V     1      ENDIØ      SPRØG    EXTERN             EVIL       SPRØG   EXTERN
FLD      R SCALR    0000D V     1      GETC     R SCALR    00000 V     1      GETC       SPRØG   00000 P
I        I SCALR    00011 V     1      IBAC     I SCALR    00012 V     1      IEØD     I SCALR  *00026 V DUMMY
IIØLT    I SCALR    00008 V     1      ITAPE    I SCALR   *00017 V DUMMY      KGDA     I SCALR  *00022 V DUMMY
KGDAØ    I SCALR    00013 V     1      KGMM     I SCALR   *00025 V DUMMY      KGHMØ    I SCALR   00016 V     1
KGMØ     I SCALR   *00023 V DUMMY      KGMØØ    I SCALR    00014 V     1      KGYR     I SCALR  *00024 V DUMMY
KGYRØ    I SCALR    00015 V     1      NW       I SCALR   *0001B V DUMMY      NX       I SCALR  *00018 V DUMMY
NY       I SCALR   *00019 V DUMMY      NZ       I SCALR   *0001A V DUMMY      PLT      R ARRAY   00001 V     7
RLAT     R SCALR   *00020 V DUMMY      RLØNG    R SCALR   *00021 V DUMMY      SPD      R SCALR   00010 V     1
STAT       SPRØG    EXTERN

         HEX              HEX              HEX              HEX              HEX              HEX
LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
   14   00017       15   00019       16   00029       30   0004D       65   0004A      110   0006E
  120   00071

LØCAL VARIABLES (23 WØRDS):

   00000 GETC      00001 PLT       00008 IIØLT     00009 DLAT      0000A DLØNG     0000B DATA
   00000 B         0000D FLD       0000E DIS       0000F DIR       00010 SPD       00011 I
   00012 IBAC      00013 KGDAØ     00014 KGMØØ     00015 KGYRØ     00016 KGHMØ

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GETC

EXTERNAL SUBPRØGRAMS REQUIRED:

   ENDIØ     EVIL      STAT      F:101     F:103     F:105     9BCDREAD  9IØDATA
   9ITØR     9SETUFN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                   DEC       HEX
                   WØRDS     WØRDS
                   -----     -----
 GENERATED CØDE:    123      0007B
     CØNSTANTS:       2      00002
LØCAL VARIABLES:     23      00017
         TEMPS:      17      00011
                   -----     -----
  TØTAL PRØGRAM:    165      000A5
```

```
      SUBRØUTINE GETF(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,KGDA,KGMØ,KGYR,KGHM,IEØD)
C
C  SUBRØUTINE GETF, FØR READING FIXES AT FIXSE FØRMAT
C
C
C      USES SUBRØUTINES ENDIØ(DUMMY), EVIL, DMTØR, STAT, ISW
C      ISW AND STAT ASSUMED INITIALIZED IN MAIN PRØGRAM
C
C
      DIMENSIØN PLT(8)
C
      IEØD= 0
      IIØUT = 108
CS    IIØUT=2
CS    IF(ISW(15))13,14,13
CS 13 PAUSE 15
   14 CALL ENDIØ
   11 READ(ITAPE,16)KGDA,KGMØ,KGYR,KGHM,ITDIF,LAT,
     1 RLATM,LØNG,RLØM,K79,K80,KC1,KC2,KC3
   16 FØRMAT(3I2,I4,1X,I3,1X,I3,1X,F6.2,1X,I4,1X,
     1   F6.2,1X,2I1,1X,3I1)
      CALL STAT(I)
      CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)
      IF (IBAD) 14, 30, 65
 65   IEØD = 1
      RETURN
   30 IF(ISW(12))55,60,55
   55 WRITE(IIØUT,56)KGDA,KGMØ,KGYR,KGHM
   56 FØRMAT('DATE=',3I3,I5)
CS 60 IF(NLFYR)70,65,70
   60 CØNTINUE
C
C
   70 RLAT=DMTØR(LAT,RLATM)
      RLØNG=DMTØR(LØNG,RLØM)
      PLT(4)=KGDA
      PLT(2)=KGMØ
      PLT(3)=KGYR
      PLT(1)=KGHM
      PLT(5)=ITDIF
      PLT(6)=KC1
      PLT(7)=KC2
      PLT(8)=KC3
      KGDAØ=KGDA
      KGMØØ=KGMØ
      KGYRØ=KGYR
      KGHMØ=KGHM
C  SELECTING DATA TØ BE PLØTTED
      IF(NX)110,120,110
  110 DATAX= PLT(NX)
  120 DATAY= PLT(NY)
      DATAZ= PLT(NZ)
      DATAW= PLT(NW)
      RETURN
      END
```

```
                      HEX     DEC                               HEX     DEC                                HEX     DEC
NAME  TYPE CLASS      LOC     WORDS      NAME  TYPE CLASS       LOC     WORDS       NAME  TYPE CLASS       LOC     WORDS
----  ---- -----   --------   -----      ----  ---- -----    --------   -----       ----  ---- -----    --------   -----
DATAW    R SCALR   *00022 V   DUMMY      DATAX    R SCALR    *0001F V   DUMMY       DATAY    R SCALR    *00020 V   DUMMY
DATAZ    R SCALR   *00021 V   DUMMY      DMTOR    R SPROG     EXTERN                ENDIO      SPROG     EXTERN
EVIL       SPROG    EXTERN               GETF     R SCALR     00000 V       1       GETF       SPROG     00000 P
I        I SCALR    00014 V       1      IBAD     I SCALR     00015 V       1       IEOD     I SCALR    *00029 V   DUMMY
IIOLT    I SCALR    00009 V       1      ISW      I SPROG     EXTERN                ITAPE    I SCALR    *0001A V   DUMMY
ITDIF    I SCALR    0000A V       1      KC1      I SCALR     00011 V       1       KC2      I SCALR     00012 V       1
KC3      I SCALR    00013 V       1      KGDA     I SCALR    *00025 V   DUMMY       KGDAO    I SCALR     00016 V       1
KGMM     I SCALR   *00028 V   DUMMY      KGMMO    I SCALR     00019 V       1       KGMO     I SCALR    *00026 V   DUMMY
KGMOO    I SCALR    00017 V       1      KGYR     I SCALR    *00027 V   DUMMY       KGYRO    I SCALR     00018 V       1
K79      I SCALR    0000F V       1      K80      I SCALR     00010 V       1       LAT      I SCALR     0000B V       1
LONG     I SCALR    0000D V       1      NW       I SCALR    *0001E V   DUMMY       NX       I SCALR    *0001B V   DUMMY
NY       I SCALR   *0001C V   DUMMY      NZ       I SCALR    *0001D V   DUMMY       PLT      R ARRAY     00001 V       8
RLAT     R SCALR   *00023 V   DUMMY      RLATM    R SCALR     0000C V       1       RLOM     R SCALR     0000E V       1
RLONG    R SCALR   *00024 V   DUMMY      STAT       SPROG     EXTERN

        HEX              HEX               HEX                HEX                HEX                HEX
LABEL   LOC     LABEL    LOC      LABEL    LOC      LABEL     LOC      LABEL     LOC      LABEL     LOC
-----  -----    -----   -----     -----   -----     -----    -----     -----    -----     -----    -----
   11  00019       14   00017        16   0002B        30    0004C        55    00051        56    00059
   60  0005E       65   00049        70   0005E       110    0008A       120    0008D

LOCAL VARIABLES (26 WORDS):

   00000 GETF     00001 PLT      00009 IIOLT    0000A ITDIF    0000B LAT      0000C RLATM
   0000D LONG     0000E RLOM     0000F K79      00010 K80      00011 KC1      00012 KC2
   00013 KC3      00014 I        00015 IBAD     00016 KGDAO    00017 KGMOO    00018 KGYRO
   00019 KGMMO

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 GETF

EXTERNAL SUBPROGRAMS REQUIRED:

   DMTOR    ENDIO    EVIL     ISW      STAT      F:101     F:102     F:103
   F:104    F:105    F:106    F:108    9BCDREAD  9BCDWRIT  9IODATA   9ITOR
   9SETLFN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                     DEC      HEX
                    WORDS    WORDS
                    -----    -----
 GENERATED CODE:     151     00097
      CONSTANTS:       1     00001
LOCAL VARIABLES:      26     0001A
          TEMPS:      17     00011
                    -----    -----
  TOTAL PROGRAM:     195     000C3
```

```
      SUBRØUTINE GETG(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,KGDA,KGMØ,KGYR,KGHM,IEØD)
C     VERSIØN 29 JULY 75, TØ CØRRECT  FREAK INITIALIZATIØN PRØBLEM
C             THAT ØCCURS ØNLY WHEN READING FRØM CARDS
C     VERSIØN 19 SEPT 1974, FØR 67 GRAVITY FØRMULA
C       VERSIØN ØF 7 AUGUST 1973, START CØNVERSIØN TØ 1967 G FØRMULA
C     GETG VERSIØN FEB 15 72
C ------ CHANGED INPUT FØRMAT FØR BACKWARD CØDE MANAGE PRØBLEM
C ------        MØDIF FØR NEW ABSTG FØRMAT HANDLING
C     GETG VERSIØN DEC 30 , 71
C     GETG VERSIØN NØV 19 , 1971
C     INPUT . NEW GSUM FØRMAT =
C                           + 3 KEYS : LTKEY , LGKEY , IAKEY
C
C     MØDIF ØN NØV 12,1971 BY MØNGET J.M. TØ INCLUDE :
C           - USE ØF DATA LØCATIØN TABLE
C           - USE ØF LABEL TAPES
C  MØD AUG 16 1971 BY FØLINSBEE TØ CØRRECT ERRØR ØN CALLING ARGS ØF GBLKI
C VERSIØN ØF JUNE 29,71 DØES NØT WRITE EØF ØNTØ ØUTPUT DEVICE
C      MØDIFIED JUNE 28 TØ  READ( ØR WRITE) BLØCKED DATA  BY A FØLINSBEE
C   VERSIØN ØF APRIL 16 TØ ØPTIØNALLY SUPRESS REWIND ØF ITAPE AND JTAPE GINØ0040
C                                                                       GINØ0050
C  WITH CØMPLETE ARGUMENT LIST,  ISØRC MØVED TØ CØME                    GINØ0060
C                                AFTER DATE                             GINØ0070
C                                                                       GINØ0080
C     SUBRØUTINE GETG, FØR GSUM FØRMATTED DATA
C                                                                       GINØ0100
C                                                                       GINØ0110
C   VERSIØN WITH DESIGNATIØN ØF INPUT MAGNETIC TAPES
C          BY USE ØF SUBRØUTINE MØUNT                                   GINØ0130
C                                                                       GINØ0140
C                                                                       GINØ0150
C       SSW(12) UP TØ LIST DATE IDENTIFICATIØN
C       SSW(27) UP TØ SUPRESS REWIND ØF TAPES AT START ØF JØB
C         =1 SUPRESS REWIND ØF ITAPE                                    GINØ0240
C     SSW(29) = 1 - TØ READ AND TEST FØR SELECTED SØURCE CØDE
C                    NUMBERS TØ BE PRØCESSED
C             = 2 - TØ READ AND TEST FØR SELECTED SØURCE CØDE
C                       NUMBERS TØ BE SKIPPED
C
C
C       SSW(30) UP FØR INPUT DATA ØN CARDS                              GINØ0190
C     SSW(40) UP TØ PRØCESS WITH BØUNDS USING DLT
C           = 0  - PRØCESS WITHØUT BØUNDS
C           = 1  - PRØCESS WITH BØUNDS USING THE DATA LØCATIØN TABLE
C       SSW(60) UP TØ PRØCESS ØNLY DATA WITH IFFC=4,  ABSTRACTER ØUTPUTGINØ0210
C       SSW(61) UP TØ REPLACE FA,BG,ELEV,LAT,LØNG WITH AVERAGED VALUES
C                                                                       GINØ0270
C     USES ENDIØ(DUMMY), EVIL, STAT, ISW                                GINØ0280
C     ASSUME ISW AND STAT INITIALIZED IN MAIN PRØGRAM                   GINØ0290
C                                                                       GINØ0300
C                                                                       GINØ0310
      DIMENSIØN IDTIN(20),IBK(20),ITK(20),IDENS(20),IDESC(17,20)        GINØ0320
      DIMENSIØN IDTØT(20),JBK(20),JTK(20),JDENS(20),JDESC(17,20)        GINØ0330
      EQUIVALENCE (DLAMI,DLABØ),(DLAMA,DLATØ),(DLØMI,DLØLE),
     * (DLØMA,DLØRI)
      DIMENSIØN PLT(20),IA(35),IAFMT(9),IASH(35),ISRC(16)
      DATA ITERI/'EITP'/
      DATA IFLAG/0/
```

```
C
      IF(IFLAG.NE.0)GØTØ50
      IFLAG=1
C
C
C ------      GETG INITIALISATIØN LØGIC
C
      IIN=105
       IIØUT = 108                                                      GINØ0390
      IEØD=0
      IDISC = 100
       KI = 1
       KØ = -2
       NEF = 1
       IFILE = 1
C                                                                       GINØ0410
      DEGRA = 1.745329E-2
       RADEG=57.29578
C                                                                       GINØ0430
      ØUTPUT ' GETG VERSIØN 29 JULY 75 FØR 67 G FØRMULA'
      IF(ISW(40).NE.0)CALL ENTCLT(J,DLATØ,DLABØ,DLØLE,DLØRI)
     *  ;  CALL SETSKP(INDICA) ; IDLT=0
     *  ; NEF=1  ;  IFILE=J-1  ;  ØUTPUT NEF,IFILE
       NZERØ=0                                                          GINØ0470
        KCDAØ=NZERØ                                                     GINØ0480
        KGMØØ=NZERØ                                                     GINØ0490
        KGYRØ=NZERØ                                                     GINØ0500
        KGHMØ=NZERØ                                                     GINØ0510
C      NRECT = NØ. ØF RECØRDS NØW WRITTEN ØN PRESENT ØUTPUT TAPE        GINØ0520
C      NEF = NØ. ØF FILE NØW BEING PRØCESSED                            GINØ0530
       NRECT = NZERØ                                                    GINØ0540
       IREC1 = 1                                                        GINØ0550
C                                                                       GINØ0560
      IF(ISW(40).NE.0)GØTØ1410
      IF(ISW(30))404,404,1410
  404 J=1                                                               GINØ0580
  405 READ (IIN,406) IDTIN(J),IBK(J),ITK(J),IDENS(J),                   GINØ0590
     1       (IDESC(K,J),K=1,17)                                        GINØ0600
  406 FØRMAT(A4,1X,A1,1X,I1,1X,I3,17A4)                                 GINØ0610
       IF(IDTIN(J).NE.ITERI) J=J+1; GØ TØ 405                           GINØ0620
       NEF=1                                                            GINØ0630
       IFILE=J - 1                                                      GINØ0640
       ØUTPUT NEF,IFILE                                                 GINØ0650
C
C ------      CHECK SSW(29) TØ SEE IF SØURCE CØDE NUMBERS
C ------      ARE TØ BE READ FØR DATA SELECTIØN
C
      IF(ISW(29).EQ.0)GØTØ10
      READ(IIN,900)ISRC
  900 FØRMAT(16I5)
      IF(ISW(29).EQ.1)WRITE(IIØUT,912)ISRC ; GØTØ1410
      WRITE(IIØUT,913)ISRC
  913 FØRMAT(1H0,10X,'SKIPPED SØURCE CØDES = ',16I5)
  912 FØRMAT(1H0,10X,'SELECTED SØURCE  CØDES = ',16I5)
C
C ------
C
 1410 IF(ISW(30))10,10,2414
   10 IF(ISW(40).EQ.0)GØTØ810
      READ(IDISC,406)IDTIN(1),IBK(1),ITK(1),IDENS(1),
     *  (IDESC(K,1),K=1,17)
  810 IF(IDTIN(1).EQ.ITERI)IEØD=1 ; RETURN
      CALL MØUNT(ITAPE,IDTIN(1))                                        GINØ0770
      ØUTPUT 'INPUT TAPE MØUNTED '
      WRITE (IIØUT,1413) IDTIN(1),IBK(1),ITK(1),IDENS(1),               GINØ0780
     1       (IDESC(K,1),K=1,17)                                        GINØ0790
 1413 FØRMAT (1X,A4,1X,A1,1X,I1,1X,I3,17A4)                             GINØ0800
      ØUTPUT '------------'
      IF(ISW(27).EQ.1)GØTØ2414
      REWIND ITAPE                                                      GINØ0820
2414  CØNTINUE                                                          GINØ0830
C
C ------       GETG INPUT LØGIC
C
   50 CALL ENDIØ                                                        GINØ0950
      IF(ISW(30).EQ.1)  GØ TØ 100                                       GINØ0960
      IF(ISW(40).NE.0) GØ TØ 700
   52  READ(ITAPE,11)IREC1,ISØRC,KGDA,KGMØ,KGYR,KGHM,
     1  DLAT,DLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,TC,IELC,IGC,
     2  RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
      GØ TØ 101                                                         GINØ1020
100   CØNTINUE                                                          GINØ1030
       READ(IIN ,469 )IREC1,ISØRC,KGDA,KGMØ,KGYR,KGHM,
     1  DLAT,DLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,TC,IELC,IGC,
     2  RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
101   CØNTINUE                                                          GINØ1090
      CALL STAT(I)                                                      GINØ1100
710   CØNTINUE
      CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)                   GINØ1110
      IF (IBAD) 50, 53, 575                                             GINØ1120
   53 IF(IREC1-2)600,70,600
  600 IF(IREC1-1)50,610,50
C
C        CØNVERSIØN ØF 1930 INTERNATIØNAL GRAVITY FØRMULA TØ THAT ØF
C              THE 1967 INTERNATIØNAL GRAVITY FØRMULA
C
  610 CØNTINUE
      RLAT = DLAT*DEGRA
      DG=3.2-(13.6*(SIN(ABS(RLAT))**2))
C      TØ AVØID PLØTTING INVALID VALUES
        IF (FA.EQ.999.AND.NX.EQ.6) GØ TØ 50
      FA=FA+DG
        IF (BG.EQ.999.AND.NX.EQ.7) GØ TØ 50
      BG=BG+DG
      GØ TØ 70
 575  IF (NEF - IFILE) 576, 577, 577                                    GINØ1240
 576  NEF = NEF + 1                                                     GINØ1250
      IF(ISW(40).EQ.0)GØTØ820
      READ(IDISC,406)IDTIN(NEF),IBK(NEF),ITK(NEF),IDENS(NEF),
     *  (IDESC(K,NEF),K=1,17)
  820 CALL MØUNT(ITAPE,IDTIN(NEF))
      ØUTPUT 'INPUT TAPE MØUNTED'
      WRITE (IIØUT,1413) IDTIN(NEF),IBK(NEF),ITK(NEF),IDENS(NEF),       GINØ1270
     1         (IDESC(K,NEF),K=1,17)                                    GINØ1280
      ØUTPUT '------------'                                             GINØ1290
      REWIND ITAPE                                                      GINØ1290
       GØ TØ 50                                                         GINØ1300
C      END ØF INPUT DATA, REQUIRED NØ. ØF FILES NØW PRØCESSED           GINØ1310
  577 IEØD=1 ; RETURN
   70 IF(ISW(12))73,73,71                                               GINØ1390
   71  WRITE(IIOLT,72)KGDA,KGMO,KGYR,KGHM                                GIN014
   72  FORMAT('DATE=',3I3,I5)                                            GIN014
 C
 C ------
 C
   73 IF(ISW(29).EG.C)GOTO173C
      IF(ISW(29).EG.2)GOTO170C
 C
 C ------       PROCESS ONLY SELECTED SOURCE CODES
 C
      DO165CJ=1,16
      IF(ISRC(J).EG.C)GOTO850
      IF(ISORC-ISRC(J))1650,173C,1650
 165C  CONTINLE
      GOTO850
 C
 C ------       IGNORE SELECTED SOURCE CODES
 C
  17CC DO1710J=1,16
      IF(ISRC(J).EG.C)GOTO173C
      IF(ISORC-ISRC(J))1710,5C,1710
  171C CONTINLE
 C
 C ------
 C
  173C RLAT=DLAT*DEGRA
      RLONG = DLONG*DEGRA
      DEPTH = IDEP
       IF(IDEP)78,74,78
   74  HEIGT=ELEV
       GO TO 80
   78  HEIGT = -DEPTH
   8C  CONTINLE
 C     CONVERTING FROM THE POTSCAM REF. NO. TO THE IGSN-71 REF. SYSTEM
 C     NX = 11 TO PLOT OBSERVED GRAVITY
       IF(NX.NE.11) GO TO 81
       IF(IREC1.EG.2) GO TO 81
       CALL OBG (K977,OBSG,GOBS,KI)
      GOBS=GOBS-14.0
   81  CONTINLE
       BGCOM=BG+TC
       PLT(1)=KGHM
       PLT(2)=ISORC
       PLT(3)=ELEV
       PLT(4)=DEPTH
       PLT(5)=HEIGT
       PLT(6)=FA
       PLT(7)=BG
       PLT(8)=TC
       PLT(9)=BGCOM
       PLT(1C)=RFA
       PLT(11)=GOBS
       PLT(12)=HEIGT/BG
        IF(ISW(6C))418,418,80C
  80C IF(IFFC-10)5C,801,50
  801  CONTINLE                                                          GIN01460
       IF(ISW(61))109,109,105
 C  SET FA, BG, AND ELEV =  AVERAGED VALUES FROM ABSTRACTER OUTPUT      GIN01480
 C  SET LAT AND LONG  TO VALUES AT CENTER OF GRID AREA                  GIN01490
  1C5  CONTINLE                                                          GIN01500
```

```
           Dθ 802 JK=1,35                                                    GINθ1510
      802  IASH(JK)=ISL(IA(JK),-24)                                          GINθ1520
           CALL PKBY(IASH,IAFMT,35)                                          GINθ1530
          DECθDE(35,803,IAFMT)NINT,I,J,AVHE,AVFA,AVBθ,NθBS,ITM,DIST
      803 FθRMAT(3I2,F8.1,2F6.1,I4,A1,F4.1)
    C
          AGRI=1./FLθAT(NINT) ; HGRI=AGRI/2
          IAX=LTKEY-89 ; Iθ=LGKEY-180
          ALV=FLθAT(IAX) ; θLV=FLθAT(Iθ)
          CLAT=ALV-HGRI-FLθAT(I-1)*AGRI
          CLθNG=θLV+HGRI+FLθAT(J-1)*AGRI
           RLAT=CLAT*DEGRA
           RLθNG=CLθNG*DEGRA
          PLT(13)=AVHE ; PLT(14)=AVFA
          PLT(15)=AVBθ ; PLT(16)=NθBS
          PLT(17)=DIST
      105  CθNTINUE                                                          GINθ1640
      418  CθNTINUE                                                          GINθ1650
           KGDAθ=KGDA                                                        GINθ1660
           KGMθθ=KGMθ                                                        GINθ1670
           KGYRθ=KGYR                                                        GINθ1680
           KGHMθ=KGHM                                                        GINθ1690
          IF(NX)1100,1200,1100
     1100 DATAX=PLT(NX)
     1200 DATAY=PLT(NY)
          DATAZ=PLT(NZ)
          DATAW=PLT(NW)
    X      θUTPUT DATAX
           RETURN
       11  FθRMAT(I1,I4,3I2,I4,2F9.4,F7.2,I3,F6.2,I5,2F6.1,F4.1,
        1    2I2,F6.1,I1,I2,35A1,1X,I1,2I3,I2)
      469  FθRMAT(I1,I4,3I2,I4,2F9.4,F7.2,I3,F6.2,I5,2F6.1,F4.1,
        1    2I2,F6.1/10X,I1,I2,35A1,1X,I1,2I3,I2)
    C
    C ------      GETG DLT INPUT LθGIC
    C
    700    CθNTINUE
          IF(ICLT.EQ.1)GθTθ821
          READ(IDISC,812)NMAX ; IPRE = NMAX ; NPRE=1
          θUTPUT NMAX
      812 FθRMAT(I6)
      322 CθNTINUE
          READ(IDISC,321,END=331)NBLθ,ILAST,LASTR,θLMAX,θLMIN
          θUTPUT NBLθ,ILAST,LASTR,θLMAX,θLMIN
      321 FθRMAT(4X,I6,I6,I3,2F9.4)
          IF(NBLθ.EQ.0)IDLT=0 ; GθTθ575
          ALMIN=FLθAT(LASTR-90)
          ALMAX=ALMIN+1.
          θLARG=θLMAX-θLMIN
          CLθUP=CLθMA+θLARG
          CLθDθ=CLθMI-θLARG
          IF((CLθUP.GE.θLMAX).AND.(CLθDθ.LE.θLMIN))GθTθ323
          IPRE=ILAST
          GθTθ322
      323 CLAUP=CLAMA+1.
          CLADθ=CLAMI-1.
          IF((CLAUP.GE.ALMAX).AND.(CLADθ.LE.ALMIN))GθTθ324
          IF(ALMAX.LT.CLADθ)GθTθ343
          IPRE=ILAST
          GθTθ322
```

```
  324 IF(IPRE.EQ.NMAX)GØTØ325
      IBEG=IPRE+1
      GØTØ326
  325 IBEG=1
C ------        NINF = INDEX FIRST REC. TØ READ
C ------        NSUP = INDEX LAST REC. TØ READ
  326 NFIR = NMAX*(NBLØ-1)
      NINF=NFIR+IBEG
      NSUP=NFIR + ILAST
C ------ AVØID TRYING  TØ READ REC. WHICH ARE ALREADY PRØCESSED
      IF(NINF.LT.NPRE)NINF=NPRE
      NSKIP=NINF-NPRE
      CALL SKPREC(ITAPE,NSKIP,'FWD')
      GØTØ(330,330,331,332,333)INDICA
  330 CØNTINUE
      NPRE=NSUP+1
      ICNREC = NSUP-NINF +1 ; ICØNT = 0
  821 IF(ICØNT.LT.ICNREC)IDLT=1 ; GØTØ870
      IDLT=0 ; GØTØ322
  870 READ(ITAPE,11)IREC1,ISØRC,KGDA,KGMØ,KGYR,KGHM,
     1  DLAT,DLØNG,ELEV,K977,ØBSG,IDEF,FA,BG,TC,IELC,IGC,
     2  RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
      ICØNT = ICØNT+1
      GØTØ101
  343 WRITE(IIØUT,344)
  344 FØRMAT(1H0,'TEST AREA ALREADY PRØCESSED',/)
      IEØD=1 ; RETURN
  331 WRITE(IIØUT,345)
  345 FØRMAT(1H0,'INCØRRECT DLT TABLE - FØUND EØF WHILE PRØCESSING
     * RECØRDS')
      IEØD =1 ; RETURN
  333 WRITE(IIØUT,346)
  346 FØRMAT(1H0,'INCØRRECT DLT TABLE - FØUND END ØF TAPE WHILE
     * SKIPPING RECØRDS',/)
      IEØD=1 ; RETURN
  332 WRITE(IIØUT,347)
  347 FØRMAT(1HC,'ERRØR CØNDITIØN WHILE SKIPPING RECØRDS',/)
      IEØD=1 ; RETURN
       END                                                              GINØ2060
```

```
                           HEX     DEC                                   HEX     DEC                                   HEX     DEC
NAME    TYPE CLASS         LØC     WØRDS    NAME    TYPE CLASS         LØC     WØRDS    NAME    TYPE CLASS         LØC     WØRDS
----    ---- -----      -------    -----    ----    ---- -----      -------    -----    ----    ---- -----      -------    -----
ABS        R SPRØG      INTRIN              AGRI       R SCALR      003F8 V        1    ALMAX      R SCALR      00409 V        1
ALMIN      R SCALR      004C8 V        1    ALV        R SCALR      003FC V        1    AVBØ       R SCALR      003F4 V        1
AVFA       R SCALR      003F3 V        1    AVHE       R SCALR      003F2 V        1    BG         R SCALR      003DE V        1
BGCØM      R SCALR      003EF V        1    CLAT       R SCALR      003FE V        1    CLØNG      R SCALR      003FF V        1
DATAW      R SCALR     *0041E V    DUMMY    DATAX      R SCALR     *0041B V    DUMMY    DATAY      R SCALR     *0041C V    DUMMY
DATAZ      R SCALR     *0041D V    DUMMY    DEGRA      R SCALR      003C9 V        1    DEPTH      R SCALR      003EC V        1
DG         R SCALR      003EB V        1    DIST       R SCALR      003F7 V        1    DLABØ      R SCALR      00349 V        1
DLADØ      R SCALR      004CE V        1    DLAMA      R SCALR      0034A V        1    DLAMI      R SCALR      00349 V        1
DLAT       R SCALR      003D7 V        1    DLATØ      R SCALR      0034A V        1    DLAUP      R SCALR      0040D V        1
DL[illegible]Ø      R SCALR      0040C V        1    DLØLE      R SCALR      0034B V        1    DLØMA      R SCALR      0034C V        1
DLØMI      R SCALR      0034B V        1    DLØNG      R SCALR      003C8 V        1    DLØRI      R SCALR      0034C V        1
DLØUP      R SCALR      004CB V        1    ELEV       R SCALR      003D9 V        1    ENDIØ        SPRØG      EXTERN
ENTCLT       SPRØG      EXTERN              EVIL         SPRØG      EXTERN              FA         R SCALR      003DD V        1
FLØAT      R SPRØG      INTRIN              GETG         SPRØG      000C0 P             GETG       R SCALR      00000 V        1
GØBS       R SCALR      003EE V        1    HEIGT      R SCALR      003ED V        1    HGRI       R SCALR      003F9 V        1
I          I SCALR      003E9 V        1    IA         I ARRAY      00361 V       35    IAFMT      I ARRAY      00384 V        9
IAKEY      I SCALR      003E8 V        1    IASH       I ARRAY      0038D V       35    IAX        I SCALR      003FA V        1
IBAC       I SCALR      003EA V        1    IBEG       I SCALR      004CF V        1    IBK        I ARRAY      00015 V       20
ICNREC     I SCALR      00414 V        1    ICØNT      I SCALR      00415 V        1    IDENS      I ARRAY      0003D V       20
IDEP       I SCALR      003DC V        1    IDESC      I ARRAY      00C51 V      340    IDISC      I SCALR      003C4 V        1
IDLT       I SCALR      003CD V        1    IDTIN      I ARRAY      000C1 V       20    IDTØT      I ARRAY      001A5 V       20
IELC       I SCALR      003E0 V        1    IEØD       I SCALR     *00425 V    DUMMY    IFBC       I SCALR      003E5 V        1
IFFC       I SCALR      003E4 V        1    IFILE      I SCALR      003C8 V        1    IFLAG      I SCALR      003C1 V        1
IGC        I SCALR      003E1 V        1    IIN        I SCALR      003C2 V        1    IIØUT      I SCALR      003C3 V        1
ILAST      I SCALR      00404 V        1    INDICA     I SCALR      003CC V        1    IØ         I SCALR      003FB V        1
IPRE       I SCALR      004C1 V        1    IREC1      I SCALR      003C4 V        1    IREGC      I SCALR      003E3 V        1
ISL        I SPRØG      INTRIN              ISØRC      I SCALR      003D6 V        1    ISRC       I ARRAY      003B0 V       16
ISW        I SPRØG      EXTERN              ITAPE      I SCALR     *00416 V    DUMMY    ITERI      I SCALR      003C0 V        1
ITK        I ARRAY      00029 V       20    ITM        I SCALR      003F6 V        1    J          I SCALR      003CB V        1
JBK        I ARRAY      001B9 V       20    JDENS      I ARRAY      001E1 V       20    JDESC      I ARRAY      001F5 V      340
JK         I SCALR      003F0 V        1    JTK        I ARRAY      001CD V       20    K          I SCALR      003D5 V        1
KGDA       I SCALR     *00421 V    DUMMY    KGDAØ      I SCALR      003CF V        1    KGHM       I SCALR     *00424 V    DUMMY
KGHMØ      I SCALR      003D2 V        1    KGMØ       I SCALR     *00422 V    DUMMY    KGMØØ      I SCALR      003D0 V        1
KGYR       I SCALR     *00423 V    DUMMY    KGYRØ      I SCALR      003D1 V        1    KI         I SCALR      003C5 V        1
KØ         I SCALR      003C6 V        1    K977       I SCALR      003DA V        1    LASTR      I SCALR      00405 V        1
LGKEY      I SCALR      003E7 V        1    LTKEY      I SCALR      003E6 V        1    MØUNT        SPRØG      EXTERN
NBLØ       I SCALR      004C3 V        1    NEF        I SCALR      003C7 V        1    NFIR       I SCALR      00410 V        1
NINF       I SCALR      00411 V        1    NINT       I SCALR      003F1 V        1    NMAX       I SCALR      00400 V        1
NØBS       I SCALR      003F5 V        1    NPRE       I SCALR      004C2 V        1    NRECT      I SCALR      003D3 V        1
NSKIP      I SCALR      00413 V        1    NSLP       I SCALR      00412 V        1    NW         I SCALR     *0041A V    DUMMY
NX         I SCALR     *00417 V    DUMMY    NY         I SCALR     *00418 V    DUMMY    NZ         I SCALR     *00419 V    DUMMY
NZERØ      I SCALR      003CE V        1    ØBG          SPRØG      EXTERN              ØBSG       R SCALR      003D8 V        1
ØLARG      R SCALR      004CA V        1    ØLMAX      R SCALR      004C6 V        1    ØLMIN      R SCALR      00407 V        1
ØLV        R SCALR      003FD V        1    PKBY         SPRØG      EXTERN              PLT        R ARRAY      0034D V       20
RADEG      R SCALR      003CA V        1    RFA        R SCALR      003E2 V        1    RLAT       R SCALR     *0041F V    DUMMY
RLØNG      R SCALR     *0042C V    DUMMY    SETSKP       SPRØG      EXTERN              SIN        R SPRØG      INTRIN
SKPREC       SPRØG      EXTERN              STAT         SPRØG      EXTERN              TC         R SCALR      003DF V        1


        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC
-----   -----    -----    -----    -----    -----    -----    -----    -----    -----    -----    -----
   10   000EF       11    00311       50    00145       52    00151       53    001A1       70    00222
   71   00227       72    0022F       73    00234       74    00262       78    00265       80    00268
   81   00277      100    00172      101    00192      105    002A2      109    002FA      321    00379
  322   00353      323    0039C      324    003AF      325    00386      326    00388      330    003D9
  331  CC41F      332  CC456      333  CC439      343  CC4CD      344  00411      345  00423
  346  CC43C      347  CC45A      404  CC076      4C5  CC078      406  00093      418  002FA
  469  CC326      575  CC1C4      576  CC1C7      577  CC21F      600  001A4      610  001A7
  7CC  CC33C      71C  CC155      800  CC29A      8C1  CC29D      802  002A5      803  002BD
  81C  CC1C6      812  CC351      820  CC1E8      821  CC3E2      870  003EB      900  000BE
  912  CCCDE      913  000D3     1100  CC3C4     120C  CC3C7     1410  000EA     1413  0012C
 165C  CC246     17CC  C024B     1710  CC253     173C  CC257     2414  00145

LØCAL VARIABLES (1C46 WØRDS):

   CCCCC GETG       CCCC1 ICTIN      00C15 IBK        0CC29 ITK        0003D IDENS      00051 IDESC
   C01A5 ICTØT      CC1B9 JBK        C01CD JTK        0C1E1 JDENS      001F5 JDESC      00349 DLAMI
   CC349 CLABØ      CC34A CLATØ      C034A DLAMA      0C34B DLØMI      0034B DLØLE      0034C DLØRI
   C034C CLØMA      CC34C FLT        C0361 IA         0C384 IAFMT      0038D IASH       003B0 ISRC
   CC3CC ITERI      CC3C1 IFLAG      C03C2 IIN        0C3C3 IIØUT      003C4 IDISC      003C5 KI
   CC3C6 KØ         CC3C7 NEF        0C3C8 IFILE.     003C9 DEGRA      003CA RADEG      003CB J
   CC3CC INDICA     CC3CD ICLT       0C3CE NZERØ      003CF KGDAØ      003D0 KGMØØ      003D1 KGYRØ
   CC3D2 KGHMØ      CC3D3 NRECT      CC3D4 IRECI      0C3D5 K          003D6 ISØRC      003D7 DLAT
   C03D8 CLØNG      CC3D9 ELEV       003DA K977       003DB ØBSG       003DC IDEP       003DD FA
   CC3DE BG         CC3DF TC         003EC IELC       003E1 IGC        003E2 RFA        003E3 IREGC
   CC3E4 IFFC       CC3E5 IFBC       003E6 LTKEY      CC3E7 LGKEY      003E8 IAKEY      003E9 I
   C03EA IBAC       0C3EB DG         003EC DEPTH      003ED HEIGT      003EE GØBS       0C3EF BGCØM
   CC3FC JK         CC3F1 NINT       003F2 AVME       003F3 AVFA       003F4 AVBØ       C03F5 NØBS
   CC3F6 ITM        0C3F7 CIST       C03F8 AGRI       CC3F9 HGRI       003FA IAX        003FB IØ
   CC3FC ALV        0C3FD ØLV        003FE CLAT       0C3FF CLØNG      00400 NMAX       00401 IPRE
   CC4C2 NPRE       CC4C3 NBLØ       C04C4 ILAST      0C4C5 LASTR      00406 ØLMAX      00407 ØLMIN
   CC4C8 ALMIN      CC4C9 ALMAX      004CA ØLARG      004CB DLØUP      0040C DLØDØ      0040D DLAUP
   C04CE CLADØ      0C4CF IBEG       0041C NFIR       0C411 NINF       00412 NSLP       00413 NSKIP
   C0414 ICNREC     0C415 ICØNT

BLANK CØMMØN (C WØRDS)

ENTRY PØINTS:

   CCCCC GETG

INTRINSIC SUBPRØGRAMS USED:

   ABS        FLØAT      ISL        SIN

EXTERNAL SUBPRØGRAMS REQUIRED:

   ENDIØ      ENTCLT     EVIL       ISW        MØUNT      ØBG        PKBY       SETSKP
   SKPREC     STAT       F:1C1      F:1C2      F:1C3      F:1C4      F:105      F:1C6
   F:1C8      9BCDRDEE   9BCDREAD   9BCDWRIT   9DECØDE    9ENDIØL    9IØDATA    9IØ[illegible]USN
   9ITØR      9PRINT     9REWIND    9SETLFN    9SIN

NUMBER ØF X CARDS IGNØRED: 1
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC        HEX
                   WØRDS      WØRDS
                   -----      -----
  GENERATED CØDE:   1130      0046A
       CØNSTANTS:     19      00013
 LØCAL VARIABLES:   1046      00416
           TEMPS:     18      00012
                   -----      -----
   TØTAL PRØGRAM:   2213      008A5
```

```
      SUBRØUTINE GETGA(ITAPE,NX,DATAX,NY,DATAY,NZ,DATAZ,
     *     RTØP,RBØT,RLFT,RRGT,RLAT,RLØNG,IEØD)
      DIMENSIØN IBUFIN(1184)
      DIMENSIØN KAVFA(36),KAVEL(36),KPTS(36)
      DIMENSIØN KCENEL(36),KCENFA(36)
      DIMENSIØN KCENLAT(36),KCENLØNG(36)
      DATA INIT/0000/
      IF(INIT.NE.0) GØ TØ 200
C                    INITIALIZATIØN
      ØUTPUT 'SUBRØUTINE GETGA VERSIØN ØF 25 ØCT 75'
      INIT =1
      NCARD=105
      NIN=37
      IEØD=0
      RADEG=57.2458
      DEGRA=1.7453E-2
      KDTØP=RTØP*RADEG+200
      KDBØT=RBØT*RADEG+200
      KDLFT=RLFT*RADEG+200
      KDRGT=RRGT*RADEG+200
  200 CØNTINUE
      IF(NIN.LT.37) GØ TØ 250
      CALL BUFFER IN(ITAPE,0,IBUFIN(1),296,IKEY,NI)
  210 CØNTINUE
      GØ TØ(211,215,213,214) IKEY
  211 ØUTPUT 'WAINTING' ; GØ TØ 210
  213 ØUTPUT 'EØF ØN ITAPE' ; GØ TØ 900
  214 ØUTPUT 'ERRØR ØN INPUT' ; STØP
  215 CØNTINUE
      DECØDE(1184,1001,IBUFIN(1),ND)
     *     KLAT,KLØNG,KDUM1,KDUM2,KDUM3,KDUM4,KDUM5,
     *       (KCENEL(I),KCENFA(I),KCENLAT(I),KCENLØNG(I),
     *     KAVEL(I),KAVFA(I),KPTS(I),I=1,36)
      NIN=0
      IF((KLAT.GT.KDTØP).ØR.(KLAT.LT.KDBØT)) NIN=37; GØ TØ 200
      IF((KLØNG.LT.KDLFT).ØR.(KLØNG.GT.KDRGT)) NIN=37 ; GØ TØ 200
  250 CØNTINUE
      GØ TØ (310,320,330,340,350) (NX-3)
C                    AVERAGE FREE AIR
  310 CØNTINUE
      NIN=NIN+1
      IF(NIN.EQ.37) GØ TØ 200
      IF(KPTS(NIN).EQ.0) GØ TØ 310
      DATAX=FLØAT(KAVFA(NIN)/10)
      GØ TØ 400
C                    AVERAGE ELEVATØØN
  320 CØNTINUE
      NIN=NIN+1
      IF(NIN.EQ.37) GØ TØ 200
      IF(KPTS(NIN).EQ.0) GØ TØ 320
      DATAX=FLØAT(KAVEL(NIN))
      GØ TØ 400
C                    CENTRAL FREE AIR
  330 CØNTINUE
      NIN=NIN+1
      IF(NIN.EQ.37) GØ TØ 200
      IF(KPTS(NIN).EQ.0) GØ TØ 330
      DATAX=FLØAT(KCENFA(NIN)/10)
      GØ TØ 400
```

```
C                                 CENTRAL ELEVATIØN
  340 CØNTINUE
      NIN=NIN+1
      IF(NIN.EQ.37) GØ TØ 200
      IF(KPTS(NIN).EQ.0) GØ TØ 340
      DATAX=FLØAT(KCENEL(NIN))
      GØ TØ 400
C                                 NUMBER ØF PØINTS
  350 CØNTINUE
      NIN=NIN+1
      IF(NIN.EQ.37) GØ TØ 200
      IF(KPTS(NIN).EQ.0) GØ TØ 350
      DATAX=FLØAT(KPTS(NIN))
  400 CØNTINUE
      RLAT=(KLAT+FLØAT(KCENLAT(NIN))/100.-200)*DEGRA
      RLØNG=(KLØNG+FLØAT(KCENLØNG(NIN))/100.-200)*DEGRA
      RETURN
C                                 END ØF FILE
  900 CØNTINUE
      IEØD=1
      RETURN
 1001 FØRMAT(37(I6,I6,2I2,2I6,I4))
      END
```

```
                            HEX      DEC                                         HEX      DEC                                        HEX      DEC
NAME      TYPE CLASS        LØC      WØRDS       NAME      TYPE CLASS            LØC      WØRDS       NAME      TYPE CLASS           LØC      WØRDS
----      ---- -----      -------    -----       ----      ---- -----          -------     -----       ----      ---- -----         -------    -----
BUFFERIN       SPRØG      EXTERN                 DATAX        R SCALR       *005B3 V    DUMMY        DATAY          UNUSED*005B5 V  DUMMY
DATAZ          UNUSED*005B7 V DUMMY              DEGRA        R SCALR        005A1 V        1        FLØAT        R SPRØG   INTRIN
GETGA          SPRØG      00000 P                GETGA        R SCALR        00000 V        1        I            I SCALR    005B0 V      1
IBUFIN       I ARRAY      00001 V   1184         IEØD         I SCALR       *005BE V    DUMMY        IKEY         I SCALR    005A6 V      1
INIT         I SCALR      0059D V      1         ITAPE        I SCALR       *005B1 V    DUMMY        KAVEL        I ARRAY    004C5 V     36
KAVFA        I ARRAY      004A1 V     36         KCENEL       I ARRAY        0050D V       36        KCENFA       I ARRAY    00531 V     36
KCENLAT      I ARRAY      00555 V     36         KCENLØNG     I ARRAY        00579 V       36        KDBØT        I SCALR    005A3 V      1
KDLFT        I SCALR      005A4 V      1         KDRGT        I SCALR        005A5 V        1        KDTØP        I SCALR    005A2 V      1
KDUM1        I SCALR      005AB V      1         KDUM2        I SCALR        005AC V        1        KDUM3        I SCALR    005AD V      1
KDUM4        I SCALR      005AE V      1         KDUM5        I SCALR        005AF V        1        KLAT         I SCALR    005A9 V      1
KLØNG        I SCALR      005AA V      1         KPTS         I ARRAY        004E9 V       36        NCARD        I SCALR    0059E V      1
ND           I SCALR      005A8 V      1         NI           I SCALR        005A7 V        1        NIN          I SCALR    0059F V      1
NX           I SCALR     *005B2 V  DUMMY         NY             UNUSED*005B4 V          DUMMY        NZ             UNUSED*005B6 V  DUMMY
RADEG        R SCALR      005A0 V      1         RØØT         R SCALR       *005B9 V    DUMMY        RLAT         R SCALR   *005BC V  DUMMY
RLFT         R SCALR     *005BA V  DUMMY         RLØNG        R SCALR       *005BD V    DUMMY        RRGT         R SCALR   *005BB V  DUMMY
RTØP         R SCALR     *005B8 V  DUMMY


        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC
-----  -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
  200  00042      210   0004D      211   00056      213   0005F      214   00069      215   00074
  250  00081      310   000BD      320   000CA      330   000D6      340   000E3      350   000EF
  400  000FA      900   00111     1001   00114

LØCAL VARIABLES (1457 WØRDS):

   00000 GETGA      00001 IBUFIN     004A1 KAVFA      004C5 KAVEL      004E9 KPTS       0050D KCENEL
   00531 KCENFA     00555 KCENLAT    00579 KCENLØNG   0059D INIT       0059E NCARD      0059F NIN
   005A0 RADEG      005A1 DEGRA      005A2 KDTØP      005A3 KDBØT      005A4 KDLFT,     005A5 KDRGT
   005A6 IKEY       005A7 NI         005A8 ND         005A9 KLAT       005AA KLØNG      005AB KDUM1
   005AC KDUM2      005AD KDUM3      005AE KDUM4      005AF KDUM5      005B0 I

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GETGA

INTRINSIC SUBPRØGRAMS USED:

   FLØAT

EXTERNAL SUBPRØGRAMS REQUIRED:

   BUFFERIN   F:108      9DECØDE    9ENCIØL    9IØDATA    9ITØR      9PRINT
   9SETUPN    9STØP
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC      HEX
                    WØRDS    WØRDS
                    -----    -----
  GENERATED CØDE:    284     0011C
       CØNSTANTS:      8     00008
 LØCAL VARIABLES:   1457     005B1
           TEMPS:     16     00010
                    -----    -----
   TØTAL PRØGRAM:   1765     006E5
```

```
          SUBRØUTINE GETGC(ITAPE,NX,DATAX,NY,DATAY,NZ,DATAZ,
     *        RTØP,RBØT,RLFT,RRGT,RLAT,RLØNG,IEØD)
C            VERSIØN ØF 10 JAN 76 TØ DØ NX PRØPERLY
C          AND TØ IMPLEMENT SSW 46
C                     ØRIGINAL VERSIØN 13 SEPT 75
          DIMENSIØN IBUFIN(6,300)
          DIMENSIØN KØDE(300),KDLAT(300),KDLØNG(300),KELDEP(300),KF
          DIMENSIØN KAVFA(10,10),KAVEL(10,10),NPTS(10,10)
          DIMENSIØN HØWFAR(10,10),KCENLAT(10,10),KCENLØNG(10,10)
          DIMENSIØN KCENEL(10,10),KCENFA(10,10)
          DIMENSIØN NCENEL(100),NCENFA(100),NCENLAT(100),NCENLØNG(100
          DIMENSIØN NAVFA(100), NAVEL(100)
          EQUIVALENCE (KAVFA,NAVFA)
          EQUIVALENCE (KAVEL,NAVEL)
          EQUIVALENCE (KCENLAT,NCENLAT)
          EQUIVALENCE (KCENEL,NCENEL)
          EQUIVALENCE (KCENFA,NCENFA)
          EQUIVALENCE (KCENLØNG,NCENLØNG)
          DATA INIT/0000/
          DATA END/'EITP'/
          IF(INIT.NE.0) GØ TØ 200
          ØUTPUT 'SUBRØUTINE GETGC VERSIØN 10 JAN 76'
          INIT=1
C                      INITIALIZATIØN
      100 CØNTINUE
          NCARD=105
          NDLT=100
          KURLAT=999
          KURLØNG=999
          NRET=0
          IEØD=0
          DØ 107 I=1,10
          DØ 106J=1,10
          NPRINT=108
          KAVFA(I,J)=0
          KAVEL(I,J)=0
          NPTS(I,J)=0
          KCENEL(I,J)=0
          KCENFA(I,J)=0
          HØWFAR(I,J)=999
          KCENLAT(I,J)=0
          KCENLØNG(I,J)=0
      106 CØNTINUE
      107 CØNTINUE
          NRET=0
          ILAST=0
          NBR=0
          NI=0
          RADEG=57.2958
          DEGRA=1.7453E-2
          IF(ISW(25).EQ.0) GØ TØ 120
          READ(NCARD,1001) NTAPESN
     1001 FØRMAT(20A4)
          IF(NTAPESN.EQ.EITP) GØ TØ 999
          CALL MØUNT(ITAPE,NTAPESN)
          WRITE(NPRINT,1002) NTAPESN
     1002 FØRMAT(1X,/,5X,'TAPE S/N',A4, ' MØUNTED')
      120 CØNTINUE
          KDTØP=RTØP*RADEG+200.
      KDBØT=RBØT*RADEG+200.
      KDLFT=RLFT*RADEG+200.
      KDRGT=RRGT*RADEG+200.
  110 CØNTINUE
      CALL BUFFER IN(ITAPE,0,IBUFIN(1,1),1650,IKEY,NI)
      GØ TØ (111,115,113,114) IKEY
  111 ØUTPUT 'WAITING';GØ TØ 110
  113 ØUTPUT'END ØF FILE ØN INPUT'; GØ TØ 900
  114 ØUTPUT'ERRØR ØN INPUT' ; STØP
  115 CØNTINUE
      NI=(NI*4)/22
      DECØDE(NI*22,1005,IBUFIN(1,1),ND)
     *   (KØDE(I),KDLAT(I),KDLØNG(I),KELDEP(I),KFA(I),I=1,NI)
      IDECØDE=0
      NIN=0
      IF(NX.EQ.4) GØ TØ 200
      IF(NX.EQ.5) GØ TØ 200
      IF(NX.EQ.6) GØ TØ 200
      IF(NX.EQ.7) GØ TØ 200
      IF(NX.GE.8.AND.NRET.EQ.0) GØ TØ 200
      IF(NX.GE.8.AND.NRET.GT.0) GØ TØ 665
  200 CØNTINUE
 1010 FØRMAT (10(1X,I6))
 1011 FØRMAT(1X,I5,4A4)
      IF(ILAST.EQ.1) GØ TØ 910
      IF(NRET.GT.0) GØ TØ 665
      IF(ISW(46).EQ.1) GØ TØ 205
      IF(NBR.GT.0) GØ TØ 205
      IF(NBR.EQ.0) READ(NDLT,1003,END=900) NBR,NDLTLT,NDLTLGR,NDLTLGL
 1003 FØRMAT(5X,I6,3I3)
C                   CHECK BØUNDS
      IF(NDLTLT.GT.KDTØP) GØ TØ 500
      IF((NDLTLGL.LE.KDRGT).AND.(NDLTLGR.GE.KDLFT)) GØ TØ 204
      GØ TØ 500
  204 CØNTINUE
      IF(NDLTLT.LT.KDBØT) GØ TØ 500
C                   WITHIN BØUNDS
  205 CØNTINUE
      IF(NIN.LT.NI) GØ TØ 220
  210 CØNTINUE
      CALL BUFFER IN(ITAPE,0,IBUFIN(1,1),1650,IKEY,NI)
      GØ TØ (211,215,213,214) IKEY
  211 ØUTPUT 'WAITING'; GØ TØ 210
  213 ØUTPUT'END ØF FILE ØN INPUT'; GØ TØ 900
  214 ØUTPUT'ERRØR ØN INPUT' ; STØP
  215 CØNTINUE
      NI=(NI*4)/22
      DECØDE(NI*22,1005,IBUFIN(1,1),ND)
     *   (KØDE(I),KDLAT(I),KDLØNG(I),KELDEP(I),KFA(I),I=1,NI)
      IDECØDE=0
 1005 FØRMAT(300(I1,2I5,I6,I5))
      NIN=0
  220 CØNTINUE
      IF(IDECØDE.EQ.1)
     *DECØDE(NI*22,1005,IBUFIN(1,1),ND)
     *   (KØDE(I),KDLAT(I),KDLØNG(I),KELDEP(I),KFA(I),I=1,NI) ;
     * IDECØDE=0
      NIN=NIN+1
      NBR=NBR-1
      KLAT=KDLAT(NIN)/100
      KLØNG=KDLØNG(NIN)/100
      IF(ISW(46).EQ.1) GØ TØ 230
      IF((KLAT.GT.KDTØP).ØR.(KLAT.LT.KDBØT)) GØ TØ 200
      IF((KLØNG.LT.KDLFT).ØR.(KLØNG.GT.KDRGT)) GØ TØ 200
  230 CØNTINUE
      GØ TØ (240,250,260,270,600,600,600,600,600,600)(NX-
C                     DEPTH
  240 CØNTINUE
      IF(KELDEP(NIN).GE.0) GØ TØ 200
      DATAX=-FLØAT(KELDEP(NIN))
      GØ TØ 480
C                     ELEVATIØN
  250 CØNTINUE
      IF(KELDEP(NIN).LT.0) GØ TØ 200
      DATAX=FLØAT(KELDEP(NIN))
      GØ TØ 480
C                     FREE AIR
  260 CØNTINUE
      DATAX=FLØAT(KFA(NIN)/10)
      GØ TØ 480
C                     BØUGER
  270 CØNTINUE
      ØUTPUT 'BØUGURE CALC NØT IMPLEMENTED';STØP
  280 CØNTINUE
      IF(NY.EQ.0) GØ TØ 480
      GØ TØ (340,350,360,370) (NY-3)
  340 CØNTINUE
      IF(KELDEP(NIN).GE.0) GØ TØ 200
      DATAY=-FLØAT(KELDEP(NIN))
      GØ TØ 380
  350 CØNTINUE
      IF(KELDEP(NIN).LT.0) GØ TØ 200
      DATAY=FLØAT(KELDEP(NIN))
      GØ TØ 380
  360 CØNTINUE
      DATAY=FLØAT(KFA(NIN)*10)
      GØ TØ 380
  370 CØNTINUE
  380 CØNTINUE
      IF(NZ.EQ.0) GØ TØ 480
      GØ TØ (440,450,460,470)(NZ-3)
  440 CØNTINUE
      IF(KELDEP(NIN).GE.0) GØ TØ 200
      DATAZ=-FLØAT(KELDEP(NIN))
      GØ TØ 480
  450 CØNTINUE
      IF(KELDEP(NIN).LT.0) GØ TØ 200
      DATAZ=FLØAT(KELDEP(NIN))
      GØ TØ 480
  460 CØNTINUE
      DATAZ=FLØAT(KFA(NIN)*10)
      GØ TØ 480
  470 CØNTINUE
  480 CØNTINUE
      RLAT=((FLØAT(KDLAT(NIN))/100.)-200.)*DEGRA
      RLØNG=((FLØAT(KDLØNG(NIN))/100.)-200.)*DEGRA
      RETURN
  500 CØNTINUE
C                     CHECK IF PAST BØUNDS
      IF((NDLTLØR.LT.KDLFT).AND.(NDLTLT.LT.KDBØT))
```

```
         *  ØUTPUT 'PAST BØUNDS' ; GØ TØ 900
C                         ØUTSIDE BØUNDS
    502 CØNTINUE
        IF(NBR.LT.(300-NIN))
       * IDECØDE=1 ;
       *                             NIN=NIN+NBR; NBR=0; GØ TØ 200
        NBR=NBR-(300-NIN)
        CALL  BUFFER IN(ITAPE,0,IBUFIN(1,1),1650,IKEY,NI)
   1012 FØRMAT(1X,2I5,3A4)
        NI=(NI*4)/22
    505 CØNTINUE
        GØ TØ(511,515,513,514) IKEY
    511 ØUTPUT'WAITING' ; GØ TØ 505
    513 ØUTPUT' EØF FØUND WHILE SKIPPING'; GØ TØ 900
    514 ØUTPUT 'ERRØR WHILE SKIPPING'
    515 CØNTINUE
        NIN=0
        GØ TØ 502
C                         ABSTRACT DATA BEFØRE PLØTTING
    600 CØNTINUE
        IF(KURLAT.EQ.999) GØ TØ 668
        IF((KLAT.EQ.KURLAT).AND.(KLØNG.EQ.KURLØNG)) GØ TØ 700
C                         NEW DEGREE SQUARE
C
C                         PREPARING PRIØR DEGREE SQUARE FØR ØUTPUT
        DØ 660 I=1,10
        DØ 650 J=1,10
        KAVFA(I,J)=KAVFA(I,J)/NPTS(I,J)
        KAVEL(I,J)=KAVEL(I,J)/NPTS(I,J)
    650 CØNTINUE
    660 CØNTINUE
    665 CØNTINUE
        NRET=NRET+1
        IF(NRET.GT.100) GØ TØ 668
        IF(NX.EQ.8) DATAX=FLØAT(NCENFA(NRET))*0.1; GØ TØ 667
        IF(NX.EQ.9) DATAX=FLØAT(NCENEL(NRET));GØ TØ 667
        IF(NX.EQ.12) DATAX=FLØAT(NAVFA(NRET))*0.1; GØ TØ 667
        IF(NX.EQ.13) DATAX=FLØAT(NAVEL(NRET))   ; GØ TØ 667
    667 CØNTINUE
        IF(DATAX.EQ.0) GØ TØ 665
        RLAT=((FLØAT(NCENLAT(NRET))/100.)-200.)*DEGRA
        RLØNG=((FLØAT(NCENLØNG(NRET))/100.)-200.)*DEGRA
        RETURN
    668 CØNTINUE
        KURLAT=KLAT
        KURLØNG=KLØNG
        NRET=0
C                         CLEARING ARRAYS BEFØRE NEW DEGREE SQUARE
        DØ 680 I=1,10
        DØ 670 J=1,10
        KAVFA(I,J)=0
        KAVEL(I,J)=0
        NPTS(I,J)=0
        KCENEL(I,J)=0
        KCENFA(I,J)=0
        HØNFAR(I,J)=999.0
        KCENLAT(I,J)=0
        KCENLØNG(I,J)=0
    670 CØNTINUE
    680 CØNTINUE
```

```
C                         SAME DEGREE SQUARE
  700 CØNTINUE
      DLAT=FLØAT(KDLAT(NIN))/100.
      DLØNG=FLØAT(KDLØNG(NIN))/100.0
      DECLAT=DLAT-FLØAT(IFIX(DLAT))+0.001
      DECLØNG=DLØNG-FLØAT(IFIX(DLØNG))+0.001
      KDECLAT=IFIX(DECLAT*100.)
      KDECLØNG=IFIX(DECLØNG*100.)
      I=IFIX(DECLAT*10.)+1
      J=IFIX(DECLØNG*10)+1
      KAVEL(I,J)=KAVEL(I,J)+KELDEP(NIN)
      KAVFA(I,J)=KAVFA(I,J)+KFA(NIN)
      NPTS(I,J)=NPTS(I,J)+1
      DIST=SQRT((KDECLAT-((I-1)*10+5))**2+(KDECLØNG-((J-1)*10+5))**2)
      IF(DIST.LT.HØWFAR(I,J)) HØWFAR(I,J)=DIST;
     *    KCENLAT(I,J)=KDLAT(NIN);
     *     KCENLØNG(I,J)=KDLØNG(NIN);
     *     KCENFA(I,J)=KFA(NIN);
     *KCENEL(I,J)=KELDEP(NIN)
      GØ TØ 200
C                         PREPARING LAST DEGREE SQUARE
C                         END ØF FILE
  900 CØNTINUE
      IF(NX.LT.8) GØ TØ 999
      ILAST=1
      DØ 906 I=1,10
      DØ 905 J=1,10
      KAVFA(I,J)=KAVFA(I,J)/NPTS(I,J)
      KAVEL(I,J)=KAVEL(I,J)/NPTS(I,J)
  905 CØNTINUE
  906 CØNTINUE
C                         ØUTPUT LAST DEGREE SQUARE
  910 CØNTINUE
      NRET=NRET+1
      IF(NRET.GT.100) GØ TØ 999
      IF(NX.EQ.8) DATAX=FLØAT(NCENFA(NRET))*0.1; GØ TØ 967
      IF(NX.EQ.9) DATAX=FLØAT(NCENEL(NRET)); GØ TØ 967
      IF(NX.EQ.12) DATAX=FLØAT(NAVFA(NRET))*0.1; GØ TØ 967
      IF(NX.EQ.13) DATAX=FLØAT(NAVEL(NRET))  ; GØ TØ 967
  967 CØNTINUE
      IF(DATAX.EQ.0) GØ TØ 910
      RLAT=((FLØAT(NCENLAT(NRET))/100.)-200.)*DEGRA
      RLØNG=((FLØAT(NCENLØNG(NRET))/100.)-200.)*DEGRA
      RETURN
C                         END ØF JØB
  999 CØNTINUE
       IEØD=1
      RETURN
      END
```

```
                        HEX     DEC                                  HEX     DEC                                  HEX     DEC
NAME     TYPE CLASS     LØC     WØRDS       NAME     TYPE CLASS      LØC     WØRDS       NAME     TYPE CLASS      LØC     WØRDS
----     ---- -----  -------   -----        ----     ---- -----   -------   -----        ----     ---- -----   -------   -----
BUFFERIN      SPRØG   EXTERN                DATAX       R SCALR  *0102C V  DUMMY        DATAY       R SCALR  *0102E V  DUMMY
DATAZ       R SCALR  *01030 V  DUMMY        DECLAT      R SCALR   01025 V      1        DECLØNG     R SCALR   01026 V      1
DEGRA       R SCALR   01013 V      1        DIST        R SCALR   01029 V      1        DLAT        R SCALR   01023 V      1
DLØNG       R SCALR   01024 V      1        EITP        R SCALR   01015 V      1        END         R SCALR   01006 V      1
FLØAT       R SPRØG   INTRIN                GETGC       R SCALR   00000 V      1        GETGC         SPRØG   00000 P
HØWFAR      R ARRAY   00E11 V    100        I           I SCALR   0100C V      1        IBUFIN      I ARRAY   00001 V   1800
IDECØDE     I SCALR   0101C V      1        IEØD        I SCALR  *01037 V  DUMMY        IFIX        I SPRØG   INTRIN
IKEY        I SCALR   0101A V      1        ILAST       I SCALR   0100F V      1        INIT        I SCALR   01005 V      1
ISW         I SPRØG   EXTERN                ITAPE       I SCALR  *0102A V  DUMMY        J           I SCALR   0100D V      1
KAVEL       I ARRAY   00D49 V    100        KAVFA       I ARRAY   00CE5 V    100        KCENEL      I ARRAY   00F3D V    100
KCENFA      I ARRAY   00FA1 V    100        KCENLAT     I ARRAY   00E75 V    100        KCENLØNG    I ARRAY   00ED9 V    100
KDBØT       I SCALR   01017 V      1        KDECLAT     I SCALR   01027 V      1        KDECLØNG    I SCALR   01028 V      1
KDLAT       I ARRAY   00835 V    300        KDLFT       I SCALR   01018 V      1        KDLØNG      I ARRAY   00961 V    300
KDRGT       I SCALR   01019 V      1        KDTØP       I SCALR   01016 V      1        KELDEP      I ARRAY   00A8D V    300
KFA         I ARRAY   00889 V    300        KLAT        I SCALR   01021 V      1        KLØNG       I SCALR   01022 V      1
KØDE        I ARRAY   00709 V    300        KURLAT      I SCALR   01009 V      1        KURLØNG     I SCALR   0100A V      1
MØUNT         SPRØG   EXTERN                NAVEL       I ARRAY   00D49 V    100        NAVFA       I ARRAY   00CE5 V    100
NBR         I SCALR   01010 V      1        NCARD       I SCALR   01007 V      1        NCENEL      I ARRAY   00F3D V    100
NCENFA      I ARRAY   00FA1 V    100        NCENLAT     I ARRAY   00E75 V    100        NCENLØNG    I ARRAY   00ED9 V    100
ND          I SCALR   0101B V      1        NDLT        I SCALR   01008 V      1        NDLTLGL     I SCALR   01020 V      1
NDLTLGR     I SCALR   0101F V      1        NDLTLT      I SCALR   0101E V      1        NI          I SCALR   01011 V      1
NIN         I SCALR   0101D V      1        NPRINT      I SCALR   0100E V      1        NPTS        I ARRAY   00DAD V    100
NRET        I SCALR   0100B V      1        NTAPESN     I SCALR   01014 V      1        NX          I SCALR  *0102B V  DUMMY
NY          I SCALR  *0102D V  DUMMY        NZ          I SCALR  *0102F V  DUMMY        RADEG       R SCALR   01012 V      1
RBØT        R SCALR  *01032 V  DUMMY        RLAT        R SCALR  *01035 V  DUMMY        RLFT        R SCALR  *01033 V  DUMMY
RLØNG       R SCALR  *01036 V  DUMMY        RRGT        R SCALR  *01034 V  DUMMY        RTØP        R SCALR  *01031 V  DUMMY
SQRT        R SPRØG   INTRIN

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC
-----  -----     -----  -----     -----  -----     -----  -----     -----  -----     -----  -----
  100  00023       106  0004A       107  0004C       110  00092       111  000A3       113  000AB
  114  00087       115  000C2       120  0007E       200  000FD       204  0012B       205  0012E
  210  00131       211  00142       213  0014A       214  00156       215  00161       220  0018C
  230  001C9       240  001DA       250  001E3       260  001EB       270  001F1       280  00200
  340  0020D       350  00216       360  0021E       370  00224       380  00224       440  00231
  450  0023A       460  00242       470  00248       480  00248       500  00257       502  00266
  505  00285       511  0028E       513  00296       514  002A3       515  002AE       600  002B1
  650  002C9       560  002C8       665  002CD       667  002F3       668  00304       670  00323
  680  00325       700  00327       900  00393       905  003A7       906  003A9       910  003AB
  967  00391       999  003E2      1001  00064      1002  00074      1003  0011D      1005  00184
 1010  000FD      1011  00101      1012  0027D

LØCAL VARIABLES (4138 WØRDS):

   00000 GETGC        00001 IBUFIN       00709 KØDE         00835 KDLAT        00961 KDLØNG       00A8D KELDEP
   00889 KFA          00CE5 KAVFA        00CE5 NAVFA        00D49 NAVEL        00D49 KAVEL        00DAD NPTS
   00E11 HØWFAR       00E75 NCENLAT      00E75 KCENLAT      00ED9 NCENLØNG     00ED9 KCENLØNG     00F3D NCENEL
   00F3D KCENEL       00FA1 NCENFA       00FA1 KCENFA       01005 INIT         01006 END          01007 NCARD
   01008 NDLT         01009 KURLAT       0100A KURLØNG      0100B NRET         0100C I            0100D J
   0100E NPRINT       0100F ILAST        01010 NBR          01011 NI           01012 RADEG        01013 DEGRA
   01014 NTAPESN      01015 EITP         01016 KDTØP        01017 KDBØT        01018 KDLFT        01019 KDRGT
   0101A IKEY         0101B ND           0101C IDECØDE      0101D NIN          0101E NDLTLT       0101F NDLTLGR
   01020 NDLTLGL      01021 KLAT         01022 KLØNG        01023 DLAT         01024 DLØNG        01025 DECLAT
   01026 DECLØNG    01027 KDECLAT    01028 KDECLØNG   01029 DIST

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GETGC

INTRINSIC SUBPRØGRAMS USED:

   FLØAT      IFIX       SQRT

EXTERNAL SUBPRØGRAMS REQUIRED:

   BUFFERIN   ISW        MØUNT      F:101      F:102      F:103      F:104      F:10
   F:106      F:108      9BCDRDEE   9BCDREAD   9BCDWRIT   9DECØDE    9ENDIØL    9INDATA
   9ITØR      9PRINT     9RTØI      9SETUPN    9SØRT      9STØP

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC      HEX
                   WØRDS    WØRDS
                   -----    -----
  GENERATED CØDE:    997    003E5
       CØNSTANTS:     16    00010
 LØCAL VARIABLES:   4138    0102A
           TEMPS:     16    00010
                   -----    -----
   TØTAL PRØGRAM:   5167    0142F
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```
      SUBROUTINE GETGS(ITAPE,NX,DATAX,JFMT,RTOP,RBOT,RLEFT,RRIGT,
     1  RLAT,RLONG,KGDA,KGMO,KGYR,KGHM,IEOC,IBLK)
C       VERSION 30 JAN 75, CORRECT READ FOR ISW(29)
C      VERSION 26 JUNE 74, FINAL TOUCHES CONVERSION TO 67 G FORMULA
C      VERSION 12 JUNE 1974
C         VERSION OF 10 AUGUST 1973, START CONVERSION TO 1967 G FORMULA
C     VERSION 30 MAY 73
C                                                                       GIN00140
C                                                                       GIN00150
C         SSW(12) UP TO LIST DATE IDENTIFICATION
C         SSW(27) UP TO SUPRESS REWIND OF TAPES AT START OF JOB
C           =1 SUPRESS REWIND OF ITAPE                                  GIN00240
C      SSW(29) = 1 - TO READ AND TEST FOR SELECTED SOURCE CODE
C                      NUMBERS TO BE PROCESSED
C               = 2 - TO READ AND TEST FOR SELECTED SOURCE CODE
C                         NUMBERS TO BE SKIPPED
C
C
C      SSW(40) UP TO PROCESS WITH BOUNDS USING DLT
C            = 0  - PROCESS WITHOUT BOUNDS
C            = 1  - PROCESS WITH BOUNDS USING THE DATA LOCATION TABLE
C                                                                       GIN00270
C      USES ENDIO(DUMMY), EVIL, STAT, ISW                               GIN00280
C      ASSUME ISW AND STAT INITIALIZED IN MAIN PROGRAM                  GIN00290
C                                                                       GIN00300
C                                                                       GIN00310
      DIMENSION IGSU(40),IFMT(40)
C
      DIMENSION BUF(50,32),BLI(128),BLK(128)
      DIMENSION IS(20,5),IL(20,5)
      DIMENSION ILON(20),IPIE(20)
      DIMENSION NVAR(20),IVFM(20,5)
C
      DIMENSION RVAR(5)
      DIMENSION IDTIN(20),IBK(20),ITK(20),IDENS(20),IDESC(17,20)        GIN00320
      DIMENSION IDTOT(20),JBK(20),JTK(20),JDENS(20),JDESC(17,20)        GIN00330
      DIMENSION PLT(20),IA(35),IAFMT(9),IASH(35),ISRC(16)
      DATA ITERI/'EITP'/
      DATA IBL/'    '/
      DATA IFLAG/0/,IFIN/0/,IFLGI/0/
      DATA IGSU/'(I1,I4,3I2,I4,2F9.4,I3, I3)
     *
     *                                                       '/
      DATA NVAR(3),ILON(3),IPIE(3),
     *  (IVFM(3,J),J=1,2),IS(3,1),IL(3,1)
     *  /1,2,1,'F7.2,    ',34,7/
      DATA NVAR(4),ILON(4),IPIE(4),
     *  (IVFM(4,J),J=1,2),IS(4,1),IL(4,1)
     *  /1,2,1,'F5.0,    ',50,5/
      DATA NVAR(5),ILON(5),IPIE(5),
     *  (IVFM(5,J),J=1,3),IS(5,1),IL(5,1),
     *                    IS(5,2),IL(5,2)
     *  /2,3,2,'F7.2,F5.0,   ',34,7,50,5/
      DATA NVAR(6),ILON(6),IPIE(6),
     *  (IVFM(6,J),J=1,2),IS(6,1),IL(6,1)
     *  /1,2,1,'F6.1,    ',55,6/
      DATA NVAR(7),ILON(7),IPIE(7),
     *  (IVFM(7,J),J=1,2),IS(7,1),IL(7,1)
     *  /1,2,1,'F6.1,    ',61,6/
```

```
      DATA NVAR(8),ILØN(8),IPIE(8),
     *  (IVFM(8,J),J=1,2),IS(8,1),IL(8,1)
     */1,2,1,'F4.1,    ',67,4/
      DATA NVAR(9),ILØN(9),IPIE(9),
     *  (IVFM(9,J),J=1,3),IS(9,1),IL(9,1),
     *                    IS(9,2),IL(9,2)
     *  /2,3,2,'F6.1,F4.1,  ',61,6,67,4/
      DATA NVAR(10),ILØN(10),IPIE(10),
     *  (IVFM(10,J),J=1,2),IS(10,1),IL(10,1)
     *  /1,2,1,'F6.1,    ',75,6/
      DATA NVAR(11),ILØN(11),IPIE(11),
     *  (IVFM(11,J),J=1,3),IS(11,1),IL(11,1)
     *  /2,3,1,'F3.0,F6.2,  ',34,9/
C
C
      DATA NVAR(13),ILØN(13),IPIE(13),
     *  (IVFM(13,J),J=1,3),IS(13,1),IL(13,1),IS(13,2),IL(13,2)
     *  /5,3,2,'4F2.0,F8.1, ',82,8,90,8/
      DATA NVAR(14),ILØN(14),IPIE(14),
     *  (IVFM(14,J),J=1,3),IS(14,1),IL(14,1),IS(14,2),IL(14,2)
     *  /5,3,2,'4F2.0,F6.1, ',82,8,98,6/
      DATA NVAR(15),ILØN(15),IPIE(15),
     *  (IVFM(15,J),J=1,3),IS(15,1),IL(15,1),IS(15,2),IL(15,2)
     *  /5,3,2,'4F2.0,F6.1, ',82,8,104,6/
      DATA NVAR(16),ILØN(16),IPIE(16),
     *  (IVFM(16,J),J=1,3),IS(16,1),IL(16,1),IS(16,2),IL(16,2)
     *  /5,3,2,'4F2.0,F4.0, ',82,8,110,4/
      DATA NVAR(17),ILØN(17),IPIE(17),
     *  (IVFM(17,J),J=1,3),IS(17,1),IL(17,1),IS(17,2),IL(17,2)
     *  /5,3,2,'4F2.0,F4.1, ',82,8,115,4/
C
      DIMENSIØN IST(20),ILT(20)
      DATA IST(1),ILT(1),IST(2),ILT(2) /1,33,121,6/
C
C
      IF(IFLAG.NE.0)GØTØ50
      IFLAG=1
C
C
C ------      GETG INITIALISATIØN LØGIC
C
      ILI= 99 $ IDL=100
      ICND=0 $ ICHA=0 $ ICØNT=0
      IIN=105
       IIØLT = 108                                                      GINØ0390
      IEØD=0
C                                                                       GINØ0410
C
      KMAX=39 $ KN=2
C
      DEGRA = 1.745329E-2
       RADEG=57.29578
C
      DLABØ=RBØT*RADEG $ DLATØ=RTØP*RADEG
      DLØLE=RLEFT*RADEG $ DLØRI=RRIGT*RADEG
C                                                                       GINØ0430
       NZERØ=0                                                          GINØ0470
        KGDAØ=NZERØ                                                     GINØ0480
        KGMØØ=NZERØ                                                     GINØ0490
        KGYRØ=NZERØ                                                     GINØ0500
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          KGHMØ=NZERØ                                                   GINØ0510
C        NRECT = NØ. ØF RECØRDS NØW WRITTEN ØN PRESENT ØUTPUT TAPE      GINØ0520
C        NEF = NØ. ØF FILE NØW BEING PRØCESSED                          GINØ0530
          NRECT = NZERØ                                                 GINØ0540
          IREC1 = 1                                                     GINØ0550
C                                                                       GINØ0560
         ØUTPUT 'GETGS VERSIØN 30 JAN 75  FØR 67 G FØRMULA'
C
C ------       CHECK SSW(29) TØ SEE IF SØURCE CØDE NUMBERS
C ------       ARE TØ BE READ FØR DATA SELECTIØN
C
      IF(ISW(29).EQ.0)GØTØ1405
      READ(IIN,900)ISRC
  900 FØRMAT(16I5)
      IF(ISW(29).EQ.1)WRITE(IIØUT,912)ISRC ; GØTØ1405
      WRITE(IIØUT,913)ISRC
  913 FØRMAT(1H0,10X,'SKIPPED SØURCE CØDES = ',16I5)
  912 FØRMAT(1H0,10X,'SELECTED SØURCE  CØDES = ',16I5)
C
C ------
C
 1405 IF(ISW(40).NE.0)CALL ENDUT(J,DLATØ,DLABØ,DLØLE,DLØRI,IDL,ILI,0)
     *  ;  CALL SETSKP(INDICA) ; IDUT=0
     *  ; NEF=1  ;  IFILE=J-1  ;  ØUTPUT NEF,IFILE
     *  ; GØ TØ 1410
      IF(ISW(30))404,404,1410
  404  J=1                                                              GINØ0580
 405  READ (IIN,406) IDTIN(J),IBK(J),ITK(J),IDENS(J),                   GINØ0590
     1        (IDESC(K,J),K=1,17)                                       GINØ0600
 406  FØRMAT(A4,1X,A1,1X,I1,1X,I3,17A4)                                 GINØ0610
       IF(IDTIN(J).NE.ITERI) J=J+1; GØ TØ 405                           GINØ0620
       NEF=1                                                            GINØ0630
       IFILE=J - 1                                                      GINØ0640
       ØUTPUT NEF,IFILE                                                 GINØ0650
C
C
 1410 IF(ISW(30))10,10,2414
   10 IF(ISW(40).EQ.0)GØTØ811
      READ(IDL,406)IDTIN(1),IBK(1),ITK(1),IDENS(1),
     *  (IDESC(K,1),K=1,17) ; IMDL=0
  811 CALL MØUNT(ITAPE,IDTIN(1))
      ØUTPUT 'INPUT TAPE MØUNTED '
      WRITE (IIØUT,1413) IDTIN(1),IBK(1),ITK(1),IDENS(1),               GINØ0780
     1       (IDESC(K,1),K=1,17)                                        GINØ0790
 1413 FØRMAT (1X,A4,1X,A1,1X,I1,1X,I3,17A4)                             GINØ0800
  810 IF(IDTIN(1).EQ.ITERI)IEØD=1 ; RETURN
      ØUTPUT '------------'
      IF(ISW(27).EQ.1)GØTØ2414
      REWIND ITAPE                                                      GINØ0820
      IF(JFMT.NE.3)PRINT920 ; IEØD=1 ; RETURN
  920 FØRMAT(1H0,5X,'JFMT NØT EQUAL TØ 3 , GETG CAN ØNLY PRØCESS GSUM
     *  DATA',/)
      DØ924I=1,40
      IFMT(I)=IGSU(I)
  924 CØNTINUE
      IF(NX.LT.3)GØTØ2414
      IF((NX.EQ.12).ØR.(NX.GT.17)) PRINT921,NX;IEØD=1; RETURN
  921 FØRMAT(1H0,5X,'NX',3X,I2,3X,' THIS ØPTIØN NØT YET INCLUDED')
C
      IFMS1=IFMT(6) ; IFMS2=IFMT(7)
      DO922I=1,ILON(NX)
      IKSL=I+5 ; IFMT(IKSL)=IVFM(NX,I)
  922 CONTINUE
      IKSL=IKSL+1 ; IFMT(IKSL)=IFMS1
      IKSL=IKSL+1 ; IFMT(IKSL)=IFMS2
C
      IST1=IST(2) ; ILT1=ILT(2)
      DO923I=1,IPIE(NX)
      KN=KN+1
      IKSL=I+1 ; IST(IKSL)=IS(NX,I) ; ILT(IKSL)=IL(NX,I)
      KMAX=KMAX+IL(NX,I)
  923 CONTINUE
      IKSL=IKSL+1 ; IST(IKSL)=IST1 ; ILT(IKSL)=ILT1
C
2414   CONTINUE                                                         GIN00530
      PRINT2415,IFMT
 2415 FORMAT(1H0,5X,'RUN TIME FORMAT = ',/,1X,20A4,/,1X,20A4,/,
     *  6X,'---------------------',//)
C
C ------       GETG INPUT LOGIC
C
   50  CALL ENDIO                                                       GIN00950
      IF(ISW(40).NE.0)GOTO501
C
   52 CALL BUFIG(ITAPE,IEND,1,0,
     *IBLK,32,KMAX,KN,IST,ILT,BLF,BLI,BLK,ICNT)
      IF(IEND.EQ.1)I=2 ; GO TO 710
C
      IF(NX.GT.2)GOTO950
      DECODE(KMAX,IFMT,BLI)IREC1,ISORC,KGDA,KGMO,KGYR,KGHM,DLAT,DLONG,
     *  LTKEY,LGKEY
      IF(NX.EQ.1)VAR=KGHM ; GOTO970
      IF(NX.EQ.2)VAR=ISORC
      GOTO970
  950 DECODE(KMAX,IFMT,BLI)IREC1,ISORC,KGDA,KGMO,KGYR,KGHM,DLAT,DLONG,
     *  (RVAR(J),J=1,NVAR(NX)),
     *  LTKEY,LGKEY
        IF(IFLGI.EQ.1) GO TO 373
        IFLGI = 1
       WRITE(IIOUT,374) IREC1
  374  FORMAT('  INPUT IREC = ',I2)
        IF (IREC1.EQ.1) OUTPUT ' CONVERTING TO 67 FORMULA IN THIS RUN'
        IF (IREC1.EQ.2) OUTPUT ' INPUT ALREADY IN 67 FORMULA'
  373   CONTINUE
      IF(NX.NE.5)GOTO953
      IF(RVAR(2).EQ.0)VAR=RVAR(1) ; GOTO970
      VAR=-RVAR(2) ; GOTO970
  953 IF(NX.NE.9)GOTO954
      VAR=RVAR(1)+RVAR(2) ; GOTO970
  954 IF(NX.NE.11)GOTO955
C      NX = 11 TO PLOT OBSERVED GRAVITY
C      THIS ROUTINE CANNOT PLOT OBSERVED GRAVITY
      A=RVAR(1)-977. ; A=A*1000.0
  621 VAR=RVAR(2)+A     ; GOTO970
  955 IF(NX.LT.13)GOTO956
      IF(RVAR(1).NE.10.)PRINT957 ; IEOD=1 ; RETURN
  957 FORMAT(1H0,10X,'IFFC CODE NOT EQUAL TO 10 ',/)
      AGRI=1./RVAR(2) ; HGRI=AGRI/2.
      IAX=LTKEY-89 ; IOX=LGKEY-180
      ALV=FLOAT(IAX) ; OLV=FLOAT(IOX)
```

```
          CLAT=ALV-HGRI-(RVAR(3)-1)*AGRI
          CLONG=OLV+HGRI+(RVAR(4)-1)*AGRI
          RLAT=CLAT*DEGRA $ RLONG=CLONG*DEGRA
          VAR=RVAR(5) $ GOTO970
      956 VAR=RVAR(1) $ GOTO970
      970 ICONT=ICONT+1 $ ICND=ICND+1
    101   CONTINUE                                                      GIN01090
           CALL STAT(I)                                                 GIN01100
    710    CONTINUE
           CALL EVIL(IIOUT,I,IBAD,KGDAO,KGMOO,KGYRO,KGHMO)              GIN01110
           IF (IBAD) 50, 53, 575                                        GIN01120
       53  IF(IREC1-2)600,70,600
      600  IF(IREC1-1)50,70,50
     575   IF (NEF - IFILE) 576, 577, 577                               GIN01240
     576   NEF = NEF + 1                                                GIN01250
          IF(ISW(40).EQ.0)GOTO820
          READ(IDL,406)IDTIN(NEF),IBK(NEF),ITK(NEF),IDENS(NEF),
         *  (IDESC(K,NEF),K=1,17) $ IMDL=0
      820 CALL MOUNT(ITAPE,IDTIN(NEF))
          OUTPUT 'INPUT TAPE MOUNTED'
          WRITE (IIOUT,1413) IDTIN(NEF),IBK(NEF),ITK(NEF),IDENS(NEF),   GIN01270
         1        (IDESC(K,NEF),K=1,17)                                 GIN01280
          OUTPUT '-----------'
          REWIND ITAPE                                                  GIN01290
           GO TO 50                                                     GIN01300
    C      END OF INPUT DATA, REQUIRED NO. OF FILES NOW PROCESSED       GIN01310
      577 IEOD=1 $ RETURN
       70  IF(ISW(12))73,73,71                                          GIN01390
       71  WRITE(IIOUT,72)KGDA,KGMO,KGYR,KGHM                           GIN01400
       72  FORMAT('DATE=',3I3,I5)                                       GIN01410
    C
    C ------
    C
       73 IF(ISW(29).EQ.0)GOTO1730
          IF(ISW(29).EQ.2)GOTO1700
    C
    C ------        PROCESS ONLY SELECTED SOURCE CODES
    C
          DO1650J=1,15
          IF(ISRC(J).EQ.0)GOTO850
          IF(ISORC-ISRC(J))1650,1730,1650
    1650  CONTINUE
          GOTO850
    C
    C ------        IGNORE SELECTED SOURCE CODES
    C
     1700 DO1710J=1,16
          IF(ISRC(J).EQ.0)GOTO1730
          IF(ISORC-ISRC(J))1710,50,1710
     1710 CONTINUE
    C
    C ------
    C
     1730 IF(ISW(60).EQ.1)GOTO1731
          RLAT=DLAT*DEGRA
          RLONG=DLONG*DEGRA
     1731 IF(NX.EQ.0)GOTO418
    C
    C        CONVERSION OF 1930 INTERNATIONAL GRAVITY FORMULA TO THAT OF
    C              THE 1967 INTERNATIONAL GRAVITY FORMULA
```

```
C
C      THIS SUB DECODES ONLY THAT VARIABLE TO BE PLOTTED.
C         NX DETERMINES THE VARIABLE.
C
           IF(NX.EQ.11)
     1                 OUTPUT ' CANNOT PLOT OBSERVED GRAVITY' .
     2           STOP
C
C
C      TO AVOID PLOTTING INVALID DATA POINTS
          IF((NX.EQ.6  .OR.
     1        NX.EQ.7  .OR.
     2        NX.EQ.9  .OR.
     3        NX.EQ.10 .OR.
     4        NX.EQ.14 .OR.
     5        NX.EQ.15).AND.
     6           VAR.GT. 990.0)
     7              GO TO 50
C
C      CORRECTION FOR FREE AIR OR BOUGUER FOR 67 G FORMULA
       RLAT =  DLAT * DEGRA
      DG=3.2-(13.6*(SIN(ABS(RLAT))**2))
C
          IF((NX.EQ.6  .OR.
     1        NX.EQ.7  .OR.
     2        NX.EQ.9  .OR.
     3        NX.EQ.10 .OR.
     4        NX.EQ.14 .OR.
     5        NX.EQ.15).AND.
     6           IREC1 .EQ. 1)
     7              VAR = VAR + DG
C
C
      PLT(NX)=VAR
  109 CONTINUE                                                          GIN01640
  418 CONTINUE                                                          GIN01650
      KGDAO=KGDA                                                        GIN01660
      KGMOO=KGMO                                                        GIN01670
      KGYRO=KGYR                                                        GIN01680
      KGHMO=KGHM                                                        GIN01690
      IF(NX)1100,1200,1100
 1100 DATAX=PLT(NX)
X      OUTPUT DATAX
 1200 RETURN
C
C ------      GETG DLT INPUT LOGIC
C
  501 IF(IDLT.EQ.1)GOTO514
      IF(ICHA.EQ.1)GOTO507
C
C ------ INPUT AN ELEMENT OF LIST OF DEGR. SQUAR. NEEDED
C
      READ(ILI,502,END=550)LA10C,LATC,LO10C,LONC
  502 FORMAT(2(I2,I1))
C
  507 CONTINUE ; ICHA=0
C
C ------ INPUT A MEMBER OF DLT
C
      READ(IDL,503,END=540)IDEN,INBR,LA10T,LAT,LO101,LON1,LO102,LON2
  503 FORMAT(A4,1X,I6,3(I2,I1))
C
C      ------  TESTING DLT FOR CONSISTENCY
C
      IF(LO101.NE.LO102)PRINT504 ; OUTPUT LO101,LO102 ; STOP
  504 FORMAT(1H0,10X,'ERROR IN DLT',/,20X,'LO101 NOT EQUAL TO LO102',/)
C
      IF(IDEN.EQ.IBL)GOTO530
      IF(IDEN.EQ.ITERI)GOTO540
C
      LO10=LO101 ; ILO=LON1-LON2+1
C
C ------  SIMULT SCANNING OF DLT AND MATCHING LIST
C
  505 KEY1=LA10T-LA10C ; KEY2=LO10-LO10C
      KEY3=LAT-LATC
C
      DO506I=1,ILO
      LON=LON1-I+1
      KEY4=LON-LONC
      IF(KEY1)520,510,506
  510 IF(KEY2)520,511,506
  511 IF(KEY3)520,512,506
  512 IF(KEY4)520,513,506
  506 CONTINUE
C
C ------  SKIPPING UNNECESSARY RECORDS
C
      DO509I=1,INOR
      CALL BUFIG(ITAPE,IEND,1,1,
     *     IBLK,32,KMAX,KN,IST,ILT,BUF,BUI,BLK,ICNT)
      IF(IEND.EQ.1)GOTO508
  509 CONTINUE
      GOTO 507
C
C ------ ERROR CONDITIONS
C
  508 PRINT534 ; IEOD=1 ; RETURN
  534 FORMAT(1H0,10X,'INCORRECT DLT . FOUND EOF WHILE SKIPPING REC.',/)
C
C ------      CONDITIONAL BRANCH TO READ PROCESS
C
  513 ICND=0 ; IDLT=1 ; OUTPUT 'PROCESS',INBR ; GOTO52
  514 IF(ICND.EQ.INBR)IDLT=0 ; GOTO501
      GOTO52
C
C ------ INPUT AN ELEM. OF MATCHING LIST
C
  520 READ(ILI,502,END=550)LA10C,LATC,LO10C,LONC
      GOTO505
C
C ------ COMPLETION MESSAGE
C
  550 PRINT551 ; IEOD=1 ; OUTPUT ICONT ; RETURN
  551 FORMAT(1H0,10X,'AREA PROCESSED = STOP',/)
C
C -------  CHANGE TAPE REEL
C
  530 IDLT=0 ; ICHA=1 ; GOTO575
C
```

```
C     ------  END ØF CLT REACHED
C
  540 PRINT541 ; IEØD=1 ; RETURN
  541 FØRMAT(1H0,10X,'END ØF CLT REACHED - STØP',/)
      END
```

```
                          HEX     DEC                                   HEX     DEC                                   HEX     DEC
NAME    TYPE CLASS        LØC     WØRDS    NAME    TYPE CLASS           LØC     WØRDS    NAME    TYPE CLASS           LØC     WØRDS
----    ---- -----     -------- -----    ----    ---- -----         -------- -----    ----    ---- -----         -------- -----
A          R SCALR      00D11 V     1    ABS        R SPRØG         INTRIN              AGRI       R SCALR          00D12 V     1
ALV        R SCALR      00D16 V     1    BLI        R ARRAY         00691 V   128       BLK        R ARRAY          00711 V   128
BLF        R ARRAY      00051 V  1600    BUFIG        SPRØG         EXTERN              CLAT       R SCALR          00D18 V     1
CLØNG      R SCALR      00D19 V     1    DATAX      R SCALR        *00D31 V DUMMY       DEGRA      R SCALR          00CF0 V     1
DG         R SCALR      00D1B V     1    DLABØ      R SCALR         00CF2 V     1       DLAT       R SCALR          00D0C V     1
CLATØ      R SCALR      00CF3 V     1    DLØLE      R SCALR         00CF4 V     1       DLØNG      R SCALR          00D0D V     1
CLØRI      R SCALR      00CF5 V     1    ENDIØ        SPRØG         EXTERN              ENDLT        SPRØG          EXTERN
EVIL         SPRØG      EXTERN           FLØAT      R SPRØG         INTRIN              GETGS      R SCALR          00000 V     1
GETGS        SPRØG      000CC F          HGRI       R SCALR         00D13 V     1       I          I SCALR          00D03 V     1
IA         I ARRAY      00C5A V    35    IAFMT      I ARRAY         00C7D V     9       IASH       I ARRAY          00C86 V    35
IAX        I SCALR      00D14 V     1    IBAC       I SCALR         00D1A V     1       IBK        I ARRAY          00912 V    20
IBL        I SCALR      00CBA V     1    IBLK       I SCALR        *00D3E V DUMMY       ICHA       I SCALR          00CEA V     1
ICNC       I SCALR      00CE9 V     1    ICNT       I SCALR         00CCA V     1       ICØNT      I SCALR          00CEB V     1
IDEN       I SCALR      00D20 V     1    IDENS      I ARRAY         0093A V    20       IDESC      I ARRAY          0094E V   340
IDL        I SCALR      00CE8 V     1    IDLT       I SCALR         00CFE V     1       IDTIN      I ARRAY          008FE V    20
IDTØT      I ARRAY      00AA2 V    20    IENC       I SCALR         00CC9 V     1       IEØD       I SCALR         *00D3D V DUMMY
IFILE      I SCALR      00D00 V     1    IFIN       I SCALR         00CBC V     1       IFLAG      I SCALR          00CB8 V     1
IFLGI      I SCALR      00CBD V     1    IFMS1      I SCALR         00CC4 V     1       IFMS2      I SCALR          00D05 V     1
IFMT       I ARRAY      00029 V    40    IGSL       I ARRAY         00CC1 V    40       IIN        I SCALR          00CEC V     1
IIØLT      I SCALR      00CED V     1    IKSL       I SCALR         00CC6 V     1       IL         I ARRAY          007F5 V   100
ILI        I SCALR      00CE7 V     1    ILØ        I SCALR         00D29 V     1       ILØN       I ARRAY          00859 V    20
ILT        I ARRAY      00CD3 V    20    ILT1       I SCALR         00CC8 V     1       IMDL       I SCALR          00D02 V     1
INBR       I SCALR      00D21 V     1    INDICA     I SCALR         00CFD V     1       IØX        I SCALR          00D15 V     1
IPIE       I ARRAY      0086D V    20    IREC1      I SCALR         00CFC V     1       IS         I ARRAY          00791 V   100
ISØRC      I SCALR      00CCB V     1    ISRC       I ARRAY         00CA9 V    16       IST        I ARRAY          00CBF V    20
IST1       I SCALR      00D07 V     1    ISW        I SPRØG         EXTERN              ITAPE      I SCALR         *00D2F V DUMMY
ITERI      I SCALR      00CB9 V     1    ITK        I ARRAY         00926 V    20       IVFM       I ARRAY          00895 V   100
J          I SCALR      00CBE V     1    JBK        I ARRAY         00AB6 V    20       JDENS      I ARRAY          00ADE V    20
JDESC      I ARRAY      00AF2 V   340    JFMT       I SCALR        *00D32 V DUMMY       JTK        I ARRAY          00ACA V    20
K          I SCALR      00D01 V     1    KEY1       I SCALR         00D2A V     1       KEY2       I SCALR          00D2B V     1
KEY3       I SCALR      00D2C V     1    KEY4       I SCALR         00D2E V     1       KGDA       I SCALR         *00D39 V DUMMY
KGDA9      I SCALR      00CF7 V     1    KGHM       I SCALR        *00D3C V DUMMY       KGHMØ      I SCALR          00CFA V     1
KGMØ       I SCALR     *00D3A V DUMMY    KGM98      I SCALR         00CF8 V     1       KGYR       I SCALR         *00D3B V DUMMY
KGYRØ      I SCALR      00CF9 V     1    KMAX       I SCALR         00CEE V     1       KN         I SCALR          00CEF V     1
LAT        I SCALR      00D23 V     1    LATC       I SCALR         00D1D V     1       LA1OC      I SCALR          00D1C V     1
LA1CT      I SCALR      00D22 V     1    LGKEY      I SCALR         00CCF V     1       LØN        I SCALR          00D2D V     1
LØNC       I SCALR      00D1F V     1    LØN1       I SCALR         00D25 V     1       LØN2       I SCALR          00D27 V     1
LØ1C       I SCALR      00D28 V     1    LØ1CC      I SCALR         00D1E V     1       LØ1Ø1      I SCALR          00D24 V     1
LØ1C2      I SCALR      00D26 V     1    LTKEY      I SCALR         00CCE V     1       MØUNT        SPRØG          EXTERN
NEF        I SCALR      00CFF V     1    NRECT      I SCALR         00CFB V     1       NVAR       I ARRAY          00881 V    20
NX         I SCALR     *00D30 V DUMMY    NZERØ      I SCALR         00CF6 V     1       ØLV        R SCALR          00D17 V     1
FLT        R ARRAY      00C46 V    20    RADEG      R SCALR         00CF1 V     1       RØØT       R SCALR         *00D34 V DUMMY
RLAT       R SCALR     *00D37 V DUMMY    RLEFT      R SCALR        *00D35 V DUMMY       RLØNG      R SCALR         *00D38 V DUMMY
RRIGT      R SCALR     *00D36 V DUMMY    RTØP       R SCALR        *00D33 V DUMMY       RVAR       R ARRAY          008F9 V     5
SETSKP       SPRØG      EXTERN           SIN        R SPRØG         INTRIN              STAT         SPRØG          EXTERN
VAR        R SCALR      00D1C V     1


         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC      LABEL     LØC
-----   -----     -----    -----     -----    -----     -----    -----     -----    -----     -----    -----
   10   000FE        50    001FA        52    00201        53    002F8        70    0035F        71    00364
   72   0036C        73    00371       101    002E9       109    003ED       373    00285       374    0025C
  404   000BC       405    000BE       406    000D9       418    003ED       501    003FB       502    0040B
  503   0041F       504    00434       505    00456       506    00474       507    0040F       508    00494
  509   0048E       510    0046B       511    0046E       512    00471       513    004AA       514    004BA
```

AD-A035 454 WHOI-77-2 FEB 77

GRAVITY DATA PROCESSING PROGRAMS.(U)

CARL BOWIN

UNCLASSIFIED WOODS HOLE OCEANOGRAPHIC INSTITUTION, MA

5 OF 6
AD-A
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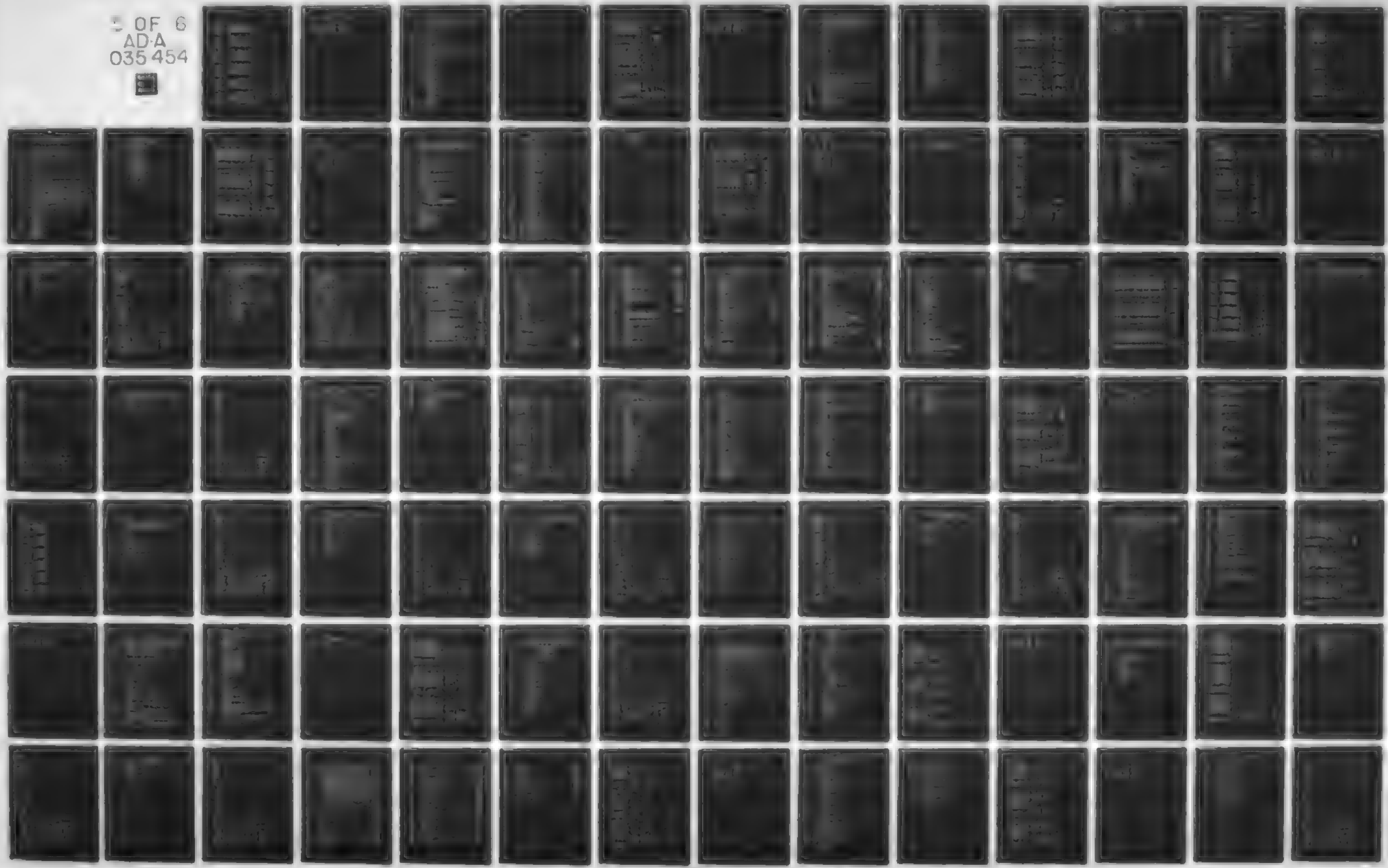

```
 520  CC4C1        53C  C04E5        534  CC49A        54C  CC4EA        541  004F0        550  004CC
 551  CC4CB        575  C02FF        576  CC302        577  C035C        600  002FB        621  002A1
 710  CC2EC        81C  0014C        811  CC117        82C  CC325        900  00064        912  00084
 913  CCC79        92C  0015F        921  CC189        922  C01AA        923  001D4        924  00177
 950  CC237        953  00251        954  CC298        955  C02A5        956  002E4        957  002B1
 97C  CC2E7       1100  003F7       1200  CC3FA       1405  C0090       1410  000F9       1413  00137
1650  CC383       170C  C0389       1710  CC390       173C  C0394       1731  0039F       2414  001DF
2415  CC1E4

LOCAL VARIABLES (3375 WORDS):

   COOCC GETGS     000C1 IGSU      00029 IFMT      00051 BUF       00691 BLI       00711 BLK
   00791 IS        007F5 IL        0U859 ILON      0086C IPIE      00881 NVAR      00895 IVFM
   C08F9 RVAR      CC8FE ICTIN     00912 IBK       00926 ITK       0093A IDENS     0094E IDESC
   C0AA2 ICTOT     C0AB6 JBK       00ACA JTK       00ADE JDENS     00AF2 JDESC     00C46 PLT
   C0C5A IA        0CC7C IAFMT     00C86 IASH      00CA5 ISRC      00CB9 ITERI     00CBA IBL
   C0CBB IFLAG     00CBC IFIN      00CBC IFLGI     00CBE J         00CBF IST       00CD3 ILT
   COCE7 ILI       0CCE8 ICL       00CE9 ICNC      00CEA ICHA      00CEB ICONT     00CEC IIN
   C0CEC IIOUT     0CCEE KMAX      00CEF KN        00CFC DEGRA     00CF1 RADEG     00CF2 DLABO
   0CCF3 CLATO     C0CF4 CLOLE     0CCF5 DLORI     0CCF6 NZERO     00CF7 KGDAO     00CF8 KGMOO
   C0CF9 KGYRO     0CCFA KGHMO     00CFB NRECT     00CFC IREC1     00CFD INDICA    00CFE IDLT
   C0CFF NEF       0CDC0 IFILE     00DC1 K         00DC2 IMDL      00D03 I         00D04 IFMS1
   C0D05 IFMS2     CCDC6 IKSL      0CD07 IST1      00DC8 ILT1      00D09 IEND      00D0A ICNT
   C0D0B ISORC     0CDCC CLAT      00DCD DLONG     00DCE LTKEY     00D0F LGKEY     00D10 VAR
   CCD11 A         00D12 AGRI      00D13 HGRI      00D14 IAX       00D15 IOX       00D16 ALV
   C0D17 OLV       C0D18 CLAT      00D19 CLONG     00D1A IBAD      00D1B DG        00D1C LA10C
   C0D1C LATC      0CD1E LO1CC     00D1F LONC      00D2C IDEN      00D21 INBR      00D22 LA10T
   C0D23 LAT       0CD24 LO1C1     00D25 LON1      00D26 LO102     00D27 LON2      00D28 LO10
   C0D29 ILO       CCD2A KEY1      00D2B KEY2      0CD2C KEY3      00D2D LON       0CD2E KEY4

BLANK COMMON (C WORDS)

ENTRY POINTS:

   COCCC GETGS

INTRINSIC SUBPROGRAMS USED:

   ABS        FLOAT      SIN

EXTERNAL SUBPROGRAMS REQUIRED:

   BUFIG      ENCIO      ENCLT      EVIL       ISW        MOUNT      SETSKP     STAT
   F:101      F:1C2      F:1C3      F:1C4      F:1C5      F:1C6      F:108      9BCDRDEE
   9BCDREAD   9BCDWRIT   9DECODE    9ENCIOL    9IODATA    9IOLUSA    9ITOR      9PRINT
   9REWINC    9SETLPN    9SIN       9STOP

NUMBER OF X CARDS IGNORED: 1
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC      HEX
                    WØRDS    WØRDS
                    -----    -----
  GENERATED CØDE:   1276     004FC
       CØNSTANTS:     20     00014
 LØCAL VARIABLES:   3375     00D2F
           TEMPS:     20     00014
                    -----    -----
   TØTAL PRØGRAM:   4691     01253
```

```
      SUBROUTINE GETH(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLONG,KGDA,KGMO,KGYR,KGHM,IEOD)
C
C        VERSION  OF  6 JUNE 1972,  ALLOWS FOR LETTERED STATION NUMBERS
C         VERSION OF 22 MAR 1972,  IGNORES COL 1 AND CHECKS IF LAT
C             AND LONG ARE ZERO
C         VERSION OF 18 MAR 1972  **  FIRST GNERATION OF ROUTINE
C
C
C  SUBROUTINE GETH,  FOR READING HEAT FLOW DATA
C
C
      DIMENSION PLT(8),M(6)
  400 IIN = 105
      IIOUT = 108
      IEOD=0
       KGDA=0
      KGMO=0
  410 CONTINUE
      READ(ITAPE,42)INO,ANO,M,STAID,LAT,A1,ILATM,KNS,LONG,A2,ILOM,KEW,
     1 IHEIT,GRAD,COND,HF,ICC,IREF,IYR
   42 FORMAT(1X,I4,A1,1X,6I1,1X,A8,1X,I2,A1,I2,A1,1X,I3,A1,I2,A1,1X,
     1 I5,1X,F4.2,1X,F4.2,1X,F5.2,3X,A1,I4,1X,I2)
      CALL STAT(I)
      CALL EVIL(IIOUT,I,IBAD,KGDAO,KGMOO,KGYRO,KGHMO)
      IF(IBAD)410,53,900
 53  CONTINUE
      KGYR=IYR
      KGHM=INO
      RLATM=ILATM
      RLOM=ILOM
C
C          CHECKING FOR ZERO LAT AND LONG
C
      IF (LAT)70,60,70
   60 IF(ILATM)70,62,70
   62 IF(LONG)70,64,70
   64 IF(ILOM)70,410,70
   70  CALL NAVIN(LAT,RLATM,KNS,LONG,RLOM,KEW,RLAT,RLONG)
      KGDAO=KGDA
      KGMOO=KGMO
      KGYRO=KGYR
      KGHMO=KGHM
      PLT(1)=INO
      PLT(2)=IHEIT
      PLT(3)=HF
      PLT(4)=GRAD
      PLT(5)=COND
      PLT(6)=M(1)*100000+M(2)*10000+M(3)*1000+M(4)*100+M(5)*10+M(6)
      PLT(7)=IREF
      PLT(8)=IYR
      IF(NX)80,85,80
   80 DATAX=PLT(NX)
   85 DATAY=PLT(NY)
      DATAZ=IHEIT
      DATAW=INO
      RETURN
  900 IEOD=1
      RETURN
```

```
          383

   60•            END
```

```
                             HEX     DEC                                  HEX     DEC                                  HEX     DEC
NAME    TYPE CLASS           LØC     WØRDS     NAME    TYPE CLASS         LØC     WØRDS     NAME    TYPE CLASS         LØC     WØRDS
----    ---- -----        -------    -----     ----    ---- -----      -------    -----     ----    ---- -----      -------    -----
ANØ        R SCALR         0C012 V       1     A1         R SCALR      C0C15 V        1     A2         R SCALR       00019 V       1
CØNC       R SCALR         0C01E V       1     DATAW      R SCALR     *00033 V    DUMMY     DATAX      R SCALR      *00030 V   DUMMY
DATAY      R SCALR        *0C031 V   DUMMY     DATAZ      R SCALR     *00032 V    DUMMY     EVIL         SPRØG       EXTERN
GETH       R SCALR         0C000 V       1     GETH         SPRØG      000C0 P              GRAD       R SCALR       0001D V       1
HF         R SCALR         0C01F V       1     I          I SCALR      00023 V        1     IBAD       I SCALR       00024 V       1
ICD        I SCALR         0C020 V       1     IEØD       I SCALR     *000C3A V   DUMMY     IHEIT      I SCALR       0001C V       1
IIN        I SCALR         0C00F V       1     IIØLT      I SCALR      00010 V        1     ILATM      I SCALR       00016 V       1
ILØM       I SCALR         0C01A V       1     INØ        I SCALR      00C11 V        1     IREF       I SCALR       00021 V       1
ITAPE      I SCALR        *0C02B V   DUMMY     IYR        I SCALR      00022 V        1     KEW        I SCALR       00018 V       1
KGDA       I SCALR        *0C036 V   DUMMY     KGCAØ      I SCALR      00025 V        1     KGHM       I SCALR      *00039 V   DUMMY
KGHMØ      I SCALR         00028 V       1     KGMØ       I SCALR     *00C37 V    DUMMY     KGMØØ      I SCALR       00026 V       1
KGYR       I SCALR        *CC038 V   DUMMY     KGYRØ      I SCALR      00027 V        1     KNS        I SCALR       00017 V       1
LAT        I SCALR         0C014 V       1     LØNG       I SCALR      00C18 V        1     M          I ARRAY       00009 V       6
NAVIN        SPRØG        EXTERN               NW           UNUSED*00C2F V    DUMMY     NX         I SC..LR     *0002C V   DUMMY
NY         I SCALR        *0C02D V   DUMMY     NZ           UNUSED*00C2E V    DUMMY     PLT        R ARRAY       00001 V       8
RLAT       R SCALR        *0C034 V   DUMMY     RLATM      R SCALR      00029 V        1     RLØM       R SCALR       0002A V       1
RLØNG      R SCALR        *0C035 V   DUMMY     STAID      R SCALR      00013 V        1     STAT         SPRØG       EXTERN


         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC
-----   -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
   42   CC037         53   0006C         60   CC06C         62   C006E         64   00070         70   00072
   80   CCCAD         85   00080        400   0C013        410   C001D        900   000BA

LØCAL VARIABLES (43 WØRDS):

   00C00 GETH      000C1 PLT       000C9 M         000CF IIN       00010 IIØUT     00011 INØ
   C0C12 ANØ       0C013 STAID     00014 LAT       00015 A1        00016 ILATM     00017 KNS
   00018 LØNG      00019 A2        0001A ILØM      00C1B KEW       0001C IHEIT     0001D GRAD
   CCC1E CØNC      0001F HF        0002C ICD       00021 IREF      00022 IYR       00023 I
   C0C24 IBAD      00025 KGCAØ     00C26 KGMØØ     00027 KGYRØ     00028 KGHMØ     00029 RLATM
   C002A RLØM

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   COCCC GETH

EXTERNAL SUBPRØGRAMS REQUIRED:

   EVIL      NAVIN     STAT      F:1C1     F:103     F:105     9BCDREAD  9IØDATA
   9IØLLSA   9ITØR     9SETUPN
```

```
HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                     DEC        HEX
                    WORDS      WORDS
                    -----      -----
  GENERATED CODE:    189       000BD
       CONSTANTS:      0       00000
 LOCAL VARIABLES:     43       0002B
           TEMPS:     21       00015
                    -----      -----
   TOTAL PROGRAM:    253       000FD
```

```
      SUBROUTINE GETL(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1  RLAT,RLONG,KGDA,KGMO,KGYR,KGHM,IEOD)
C     VERSION 16 APRIL 1975, TO CORRECT KEYPUNCH ERROR
C       VERSION OF 8 APRIL 1975,  TO ADD SELECTION OF TOTAL
C             ACCELERATION WITH SIGN OF RADIAL COMPONENT
C       VERSION OF 23 MAR 1973,  ADDING BOUGUER CALCULATION
C       VERSION OF 28 FEB 1973,  CHANGE FROM MSC FORMAT TO WHOI [illegible]
C     VERSION OF 27 OCT 1972
C  SUBROUTINE GETL, READS LUNAR DATA FROM MSC SFSN PROGRAM
C
C       SSW(34) = 1, TO READ LUNAR DATA ON 2 CARDS
C       SSW(35) = 1, TO WRITE LUNAR DATA ON 2 CARDS
C
      DIMENSION PLT(15)
     DIMENSION ID(7)
     DATA ISRT/0/
      IF(ISRT.NE.0) GO TO 50
      IIN=105
      IIOUT=108
      IEOD=0
      OUTPUT ' SUBROUTINE GETL, VERSION OF 15 APRIL 1975'
      KGDAO=0
      KGMOO=0
      KGYRO=0
      KGHMO=0
      DEGRA=1.745329E-2
      ISRT = 1
C  ************************
C
C       SETTING DENSITY VALUES FOR RIM AND CRUST
C
      RIMD=2.50
      CRUSTD=2.73
C  ************************
C
C       END OF INITIALIZATION
C
   50 IEOD=0
      IF(ISW(34)-1)51,55,51
   51 READ(ITAPE,100)  IREC,ISORC,KDA,KMO,KYR,KHM,SEC,DLAT,DLONG,SVEC,
     * ALTL,AZ,SINC,STAC,SNAC,FA,THEOR,KSST,KSSN,KSSR,KSSA,ELEV,ELFL,
     * ID,LTKEY,LGKEY
  100 FORMAT(I1,I4,3I2,I4,F5.2,2F9.4,F8.3,F7.3,F6.2,F6.2,F6.1,F6.1,
     * F6.1,F9.2,4I3,2F7.3,7A1,1X,2I3)
      GO TO 58
   55 READ(ITAPE,102)  IREC,ISORC,KDA,KMO,KYR,KHM,SEC,DLAT,DLONG,SVEC,
     * ALTL,AZ,SINC,STAC,SNAC,FA,THEOR,KSST,KSSN,KSSR,KSSA,ELEV,ELFL,
     * ID,LTKEY,LGKEY
  102 FORMAT(I1,I4,3I2,I4,F5.2,2F9.4,F8.3,F7.3,F6.2,F6.2,F6.1,F6.1/
     * F6.1,F9.2,4I3,2F7.3,7A1,1X,2I3)
   58 CALL STAT(I)
      CALL EVIL(IIOUT,I,IBAD,KGDAO,KGMOO,KGYRO,KGHM)
     IF(IBAD)50,60,900
   60 CONTINUE
      IF(IREC.EQ.1) GO TO 65
      OUTPUT 'IREC DOES NOT = 1'
      IF(ISW(34).NE.1) GO TO 50
C   FOR DATA READ FROM 2 CARDS
   61 READ(ITAPE,62)
   62 FØRMAT(1X)
      GØ TØ 50
   65 CØNTINUE
      KGDAØ= KDA
      KGMØØ= KMØ
      KGYRØ= KYR
      KGHM = KHM
      RLAT = DLAT*DEGRA
      RLØNG= DLØNG*DEGRA
      GØBS = FA+THEØR
      PLT(1)= SVEC
      PLT(2)= SVEC -1738.0
      IF(NX.NE.3.ØR.NX.NE.4) GØ TØ 80
      IF (ALTL.LT.0.001)PLT(3)=0.; PLT(4)=0; GØ TØ 50
   80 PLT(3) = ALTL
      PLT(4)=(SVEC-ALTL)-1738.0
   85 PLT(5)=AZ
      PLT(6)=SINC
      PLT(7)=STAC
      PLT(8)=SNAC
      PLT(9)=FA
      PLT(10)=THEØR
      PLT(11) = GØBS
      PLT(12) = ELEV
      IF(NX.EQ.13.AND.ALTL.LT.0.001) PLT(13)=0.; GØ TØ 50
      PLT(13)=ELFL
      IF(ELFL)22,23,23
C     SETTING DENSITY TØ THAT ØF CRATER RIM
   22 DENSC=RIMC
      GØ TØ 24
C       SETTING DENSITY TØ THAT ØF CRUST
   23 DENSC=CRUSTD
   24 CØNTINUE
      BG=FA - ((DENSC*ELFL)*0.04185)
      PLT(14)=BG
C   DETERMINING TØTAL ACCELERATIØN MAGNITUDE
      CALL TØTAC(STAC,SNAC,FA,TACEL)
      PLT(15)= TACEL
      IF(NX)90,95,90
   90 DATAX=PLT(NX)
   95 DATAY=PLT(NY)
      DATAZ= PLT(2)
      RETURN
  900 IEØD = 1
      RETURN
      END
```

```
                     HEX    DEC                                 HEX    DEC                                 HEX    DEC
NAME   TYPE CLASS    LØC    WØRDS       NAME   TYPE CLASS       LØC    WØRDS       NAME   TYPE CLASS       LØC    WØRDS
----   ---- -----  -------  -----       ----   ---- -----     -------  -----       ----   ---- -----     -------  -----
ALTL      R SCALR  0C02B V      1       AZ        R SCALR     00C2C V      1       BG        R SCALR     0003E V      1
CRLSTC    R SCALR  0C020 V      1       DATAW       UNUSED*00C48 V DUMMY       DATAX     R SCALR    *00045 V DUMMY
DATAY     R SCALR *0C046 V DUMMY        DATAZ     R SCALR    *00C47 V DUMMY        DEGRA     R SCALR     0001E V      1
DENSC     R SCALR  0C03D V      1       DLAT      R SCALR     C0C28 V      1       DLØNG     R SCALR     00029 V      1
ELEV      R SCALR  00036 V      1       ELFL      R SCALR     C0037 V      1       EVIL        SPRØG     EXTERN
FA        R SCALR  0C030 V      1       GETL        SPRØG     000C0 P              GETL      R SCALR     00000 V      1
GØBS      R SCALR  0C03C V      1       I         I SCALR     00C3A V      1       IBAD      I SCALR     0003B V      1
ID        I ARRAY  0C010 V      7       IEØD      I SCALR    *C0C4F V DUMMY        IIN       I SCALR     00018 V      1
IIØLT     I SCALR  0C019 V      1       IREC      I SCALR     00C21 V      1       ISØRC     I SCALR     00022 V      1
ISRT      I SCALR  00017 V      1       ISW       I SPRØG     EXTERN               ITAPE     I SCALR    *00040 V DUMMY
KDA       I SCALR  0C023 V      1       KGDA        UNUSED*00C4B V DUMMY       KGDAØ     I SCALR     0001A V      1
KGHM      I SCALR *0C04E V DUMMY        KGHMØ     I SCALR     0001D V      1       KGMØ        UNUSED*0004C V DUMMY
KGMØØ     I SCALR  CC01B V      1       KGYR        UNUSED*00C4D V DUMMY       KGYRØ     I SCALR     0001C V      1
KHM       I SCALR  0C026 V      1       KMØ       I SCALR     00024 V      1       KSSA      I SCALR     00035 V      1
KSSN      I SCALR  0C033 V      1       KSSR      I SCALR     00C34 V      1       KSST      I SCALR     00032 V      1
KYR       I SCALR  CC025 V      1       LGKEY     I SCALR     00C39 V      1       LTKEY     I SCALR     00038 V      1
NW          UNUSED*0C044 V DUMMY        NX        I SCALR    *0C041 V DUMMY        NY        I SCALR    *00042 V DUMMY
NZ          UNUSED*0C043 V DUMMY        PLT       R ARRAY     000C1 V     15       RIMD      R SCALR     0001F V      1
RLAT      R SCALR *0C049 V DUMMY        RLØNG     R SCALR    *00C4A V DUMMY        SEC       R SCALR     00027 V      1
SINC      R SCALR  0C02D V      1       SNAC      R SCALR     00C2F V      1       STAC      R SCALR     0002E V      1
STAT        SPRØG  EXTERN               SVEC      R SCALR     00C2A V      1       TACEL     R SCALR     0003F V      1
THEØR     R SCALR  00031 V      1       TØTAC       SPRØG     EXTERN


        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC
-----   -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
   22   CC122         23   00125         24   CC127         50   C003B         51   00042         55   0007B
   58   CC033         6C   000C2         61   CC0D4         62   C00D8         65   000D8         80   000FF
   85   CC105         9C   00139         95   CC13C        100   C0063        102   0009C        900   00142


LØCAL VARIABLES (64 WØRDS):

   CCC0C GETL      000C1 PLT       0001C ID        00017 ISRT      00018 IIN       00019 IIØUT
   00C1A KGDAØ     0001B KGMØØ     C001C KGYRØ     0001D KGHMØ     0001E DEGRA     0001F RIMD
   C0C2C CRLSTC    00021 IREC      00022 ISØRC     00023 KDA       00024 KMØ       00025 KYR
   C0C26 KHM       00027 SEC       00028 DLAT      00029 DLØNG     0002A SVEC      0002B ALTL
   C0C2C AZ        0002D SINC      0002E STAC      0002F SNAC      00030 FA        00031 THEØR
   CC032 KSST      00033 KSSN      00034 KSSR      00035 KSSA      00036 ELEV      00037 ELFL
   C0C38 LTKEY     00039 LGKEY     0003A I         C003B IBAD      0003C GØBS      0003D DENSC
   C0C3E BG        0C03F TACEL

BLANK CØMMØN (C WØRDS)

ENTRY PØINTS:

   C0CCC GETL

EXTERNAL SUBPRØGRAMS REQUIRED:

   EVIL       ISW        STAT       TØTAC      F:101      F:103      F:105      F:108
   9ECDREAD   SENCIØL    9IØCATA    9IØLUSA    9PRINT     SSETUPN
```

```
HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                      DEC       HEX
                     WORDS     WORDS
                     -----     -----
   GENERATED CODE:    325      00145
        CONSTANTS:      7      00007
  LOCAL VARIABLES:     64      00040
            TEMPS:     17      00011
                     -----     -----
    TOTAL PROGRAM:    413      0019D
```

```
      SUBRØUTINE GETM(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,RLAT,
     1RLØNG,KGDA,KGMØ,KGYR,KGHM,IEØD)
C
C     SUBRØUTINE GETM,FØR READING BATHYMETRY AT MBATR FØRMAT
C
C     CHANGED 8 NØV. 1971 BY R.C. GRØMAN TØ UNIFY DEFINITIØN ØF
C            PLT(1)=TIME IN ALL 'GET' SUBRØUTINES
C
      DIMENSIØN PLT(7)
      IEØD=0
      IIØUT=108
   14 CALL ENDIØ
   15 READ(ITAPE,16)KGDA,KGMØ,KGYR,KGHM,ITZ,DATA,MTAB,CDFM,CDM,DLAT,DLØN
     1G,DIS,DIR,SPD
   16 FØRMAT(3I2,I4,1X,I3,1X,F5.0,1X,I2,2X,F5.0,2X,F5.0,1X,F7.3,1X,F8.3,
     11X,F7.1,1X,F3.0,1X,F4.1)
      CALL STAT(I)
      CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)
      IF(IBAD)14,30,65
   65 IEØD=1
      RETURN
   30 RLAT=DLAT*(1.0/57.29578)
      RLØNG=DLØNG*(1.0/57.29578)
      PLT(1)=KGHM
      PLT(2)=CDFM
      PLT(3)=CDM
      PLT(4)=DIS
      PLT(5)=DIR
      PLT(6)=SPD
      PLT(7)=DATA
      KGDAØ=KGDA
      KGMØØ=KGMØ
      KGYRØ=KGYR
      KGHMØ=KGHM
C     SELECTING DATA PØINT TØ BE PLØTTED
      IF(NX)110,120,110
  110 DATAX=PLT(NX)
  120 DATAY=PLT(NY)
      DATAZ=PLT(NZ)
      DATAW=PLT(NW)
      RETURN
       END
```

```
                       HEX      DEC                             HEX      DEC                             HEX      DEC
NAME   TYPE CLASS      LØC      WØRDS    NAME   TYPE CLASS      LØC      WØRDS    NAME   TYPE CLASS      LØC      WØRDS
----   ---- -----   -------     -----    ----   ---- -----   -------     -----    ----   ---- -----   -------     -----
CDFM      R SCALR    0000C V        1    CDM       R SCALR    0000D V        1    DATA      R SCALR    0000A V        1
DATAW     R SCALR   *00021 V    DUMMY    DATAX     R SCALR   *0001E V    DUMMY    DATAY     R SCALR   *0001F V    DUMMY
DATAZ     R SCALR   *00020 V    DUMMY    DIR       R SCALR    00011 V        1    DIS       R SCALR    00010 V        1
DLAT      R SCALR    0000E V        1    DLØNG     R SCALR    0000F V        1    ENDIØ       SPRØG    EXTERN
EVIL        SPRØG    EXTERN              GETM      R SCALR    00000 V        1    GETM        SPRØG    00000 P
I         I SCALR    00013 V        1    IBAD      I SCALR    00014 V        1    IEØD      I SCALR   *00028 V    DUMMY
IIØLT     I SCALR    00008 V        1    ITAPE     I SCALR   *00019 V    DUMMY    ITZ       I SCALR    00009 V        1
KGDA      I SCALR   *00024 V    DUMMY    KGDAØ     I SCALR    00015 V        1    KGHM      I SCALR   *00027 V    DUMMY
KGHMØ     I SCALR    00018 V        1    KGMØ      I SCALR   *00025 V    DUMMY    KGMØØ     I SCALR    00016 V        1
KGYR      I SCALR   *00026 V    DUMMY    KGYRØ     I SCALR    00017 V        1    MTAB      I SCALR    0000B V        1
NW        I SCALR   *0001D V    DUMMY    NX        I SCALR   *0001A V    DUMMY    NY        I SCALR   *0001B V    DUMMY
NZ        I SCALR   *0001C V    DUMMY    PLT       R ARRAY    00001 V        7    RLAT      R SCALR   *00022 V    DUMMY
RLØNG     R SCALR   *00023 V    DUMMY    SPD       R SCALR    00012 V        1    STAT        SPRØG    EXTERN

        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
   14   00017        15   00019        16   00028        30   00053        65   00050       110   00074
  120   00077

LØCAL VARIABLES (25 WØRDS):

   00000 GETM      00001 PLT       00008 IIØLT     00009 ITZ       0000A DATA      0000B MTAB
   0000C CDFM      0000D CDM       0000E DLAT      0000F DLØNG     00010 DIS       00011 DIR
   00012 SPD       00013 I         00014 IBAD      00015 KGDAØ     00016 KGMØØ     00017 KGYRØ
   00018 KGHMØ

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GETM

EXTERNAL SUBPRØGRAMS REQUIRED:

   ENDIØ     EVIL      STAT      F:101     F:103     F:105     9BCDREAD  9IØDATA
   9ITØR     9SETLPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC       HEX
                     WØRDS     WØRDS
                     -----     -----
  GENERATED CØDE:      129     00081
       CØNSTANTS:        2     00002
 LØCAL VARIABLES:       25     00019
           TEMPS:       17     00011
                     -----     -----
   TØTAL PRØGRAM:      173     000AD
```

```
      SUBROUTINE GETP(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1  RLAT,RLONG,KGDA,KGMO,KGYR,KGHM,IEOC)
C  SUBROUTINE GETP,  FOR INPUT OF SEISMIC REFRACTION
C           PROFILE DATA AT SPFMT FORMAT
C
C
C  SSW(32)  UP TO READ SPFMT DATA ON TWO CARDS
C  SSW(33)  UP TO WRITE SPFMT DATA ON TWO CARDS
C
      DIMENSION FLT(15) ,IDESC(6)
      DATA K9,NEW,NNS/'9   ','W   ','S   '/
C
C     USES SUBROUTINES EVIL, ISW, STAT  ,DMTOR
C
C  **************************************************
C  **************************************************
C
      IIN = 105
      IIOUT = 108
      KGDA=0
      KGMO=0
      KGYR=0
C
C  READING U OF TORONTO WORLD SEISMIC REFRACTION COMPILATION
 10   CONTINUE
      IF(ISW(32))15,12,15
   12 READ(ITAPE,990)IREC1,ISTA,KEY,LAT,LATM,KNS,LONG,LOM,
     1 KEW,J1,K1,J2,K2,J3,K3,J4,K4,J5,K5,J6,K6,J7,K7,J8,K8,
     2 IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,STHIK,CRVN,
     3 WGTN,AVWTN,CRVW,WGTW,AVWTW
  990 FORMAT(I1,I4,A1,I2,I2,A1,I3,I2,A1,8(I2,I3),I2,I4,4I1,
     1 I1,I2,6A2,2F4.1,F3.1,2F6.0,1X,F3.1,2F6.0,5X)
      GO TO 18
   15 READ(ITAPE,991)IREC1,ISTA,KEY,LAT,LATM,KNS,LONG,LOM,
     1 KEW,J1,K1,J2,K2,J3,K3,J4,K4,J5,K5,J6,K6,J7,K7,J8,K8,
     2 IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,STHIK,CRVN,
     3 WGTN,AVWTN,CRVW,WGTW,AVWTW
  991 FORMAT(I1,I4,A1,I2,I2,A1,I3,I2,A1,8(I2,I3),I2,I4,4I1,
     1 I1,I2/10X,6A2,2F4.1,F3.1,2F6.0,1X,F3.1,2F6.0,5X)
   18 CALL STAT(I)
      CALL EVIL(IIOUT,I,IBAD,KDA,KMO,KYR,ISTAO)
      IF (IBAD) 10, 20, 900
C  CHECKING IF KEY = 9
   19 IF(KEY-K9)20,10,20
   20 ELEV=NELEV
      ELEV=ELEV * 0.01
      VMANT=IMANT
      VMANT=VMANT * 0.1
      KGHM=ISTA
   50 IF(N1-2) 70,60,70
C  SEA SEISMIC PROFILE
   60 VELW= 1.5
      HEIGT=-ELEV
      GO TO 80
C  LAND SEISMIC PROFILE
   70 VELW= 0.0
      HEIGT=ELEV
C  MAIN PLOTTING LOOP
   80 RLATM = LATM
```

```
      RLØM  = LØM
      RLAT  =DMTØR(LAT,RLATM)
      RLØNG =DMTØR(LØNG,RLØM)
      IF(KNS-NNS)54, 52, 54
   52 RLAT = -RLAT
   54 IF(KEW-NEW)58,56,58
   56 RLØNG = -RLØNG
   58 PLT(1)=ISTA
      PLT(2)=HEIGT
      PLT(3)=VMANT
      PLT(4)=DINE
      PLT(5)=STRIK
      PLT(6)=CRVN
      PLT(7)=WGTN
      PLT(8)=AVWTN
      PLT(9)=CRVW
      PLT(10)=WGTW
      PLT(11)=AVWTW
C SELECTING DATA TØ BE PLØTTED
      IF(NX)110,120,110
  110 DATAX=PLT(NX)
  120 DATAY=PLT(NY)
      DATAZ=PLT(NZ)
      DATAW=PLT(NW)
      IEØD=0
      RETURN
  900 IEØD=1
      RETURN
      END
```

```
                          HEX      DEC                              HEX      DEC                              HEX      DEC
NAME   TYPE CLASS         LØC      WØRDS     NAME   TYPE CLASS       LØC      WØRDS     NAME   TYPE CLASS       LØC      WØRDS
----   ---- -----       -------    -----     ----   ---- -----     -------    -----     ----   ---- -----     -------    -----
AVWTN     R SCALR       00040 V        1     AVWTW     R SCALR     00043 V        1     CRVN      R SCALR     0003E V        1
CRVW      R SCALR       00041 V        1     DATAW     R SCALR    *00058 V    DUMMY     DATAX     R SCALR    *00055 V    DUMMY
DATAY     R SCALR      *00056 V    DUMMY     DATAZ     R SCALR    *00057 V    DUMMY     DINE      R SCALR     0003C V        1
CMTØR     R SPRØG       EXTERN               ELEV      R SCALR     0004A V        1     EVIL        SPRØG     EXTERN
GETP        SPRØG       0000C F              GETP      R SCALR     00000 V        1     HEIGT     R SCALR     0004D V        1
I         I SCALR       00044 V        1     IBAC      I SCALR     00045 V        1     IDESC     I ARRAY     00010 V        6
IEØC      I SCALR      *0005F V    DUMMY     IIN       I SCALR     00019 V        1     IIØUT     I SCALR     0001A V        1
IMANT     I SCALR       00034 V        1     IREC1     I SCALR     0001B V        1     ISTA      I SCALR     0001C V        1
ISTAØ     I SCALR       00049 V        1     ISW       I SPRØG     EXTERN               ITAPE     I SCALR    *00050 V    DUMMY
IYR       I SCALR       0003B V        1     J1        I SCALR     00024 V        1     J2        I SCALR     00026 V        1
J3        I SCALR       00028 V        1     J4        I SCALR     0002A V        1     J5        I SCALR     0002C V        1
J6        I SCALR       0002E V        1     J7        I SCALR     00030 V        1     J8        I SCALR     00032 V        1
KDA       I SCALR       00046 V        1     KEW       I SCALR     00023 V        1     KEY       I SCALR     0001D V        1
KGDA      I SCALR      *0005B V    DUMMY     KGMM      I SCALR    *0005E V    DUMMY     KGMØ      I SCALR    *0005C V    DUMMY
KGYR      I SCALR      *0005D V    DUMMY     KMØ       I SCALR     00047 V        1     KNS       I SCALR     00020 V        1
KYR       I SCALR       00048 V        1     K1        I SCALR     00025 V        1     K2        I SCALR     00027 V        1
K3        I SCALR       00029 V        1     K4        I SCALR     0002B V        1     K5        I SCALR     0002D V        1
K6        I SCALR       0002F V        1     K7        I SCALR     00031 V        1     K8        I SCALR     00033 V        1
K9        I SCALR       00016 V        1     LAT       I SCALR     0001E V        1     LATM      I SCALR     0001F V        1
LØM       I SCALR       00022 V        1     LØNG      I SCALR     00021 V        1     MET       I SCALR     0003A V        1
NELEV     I SCALR       00035 V        1     NEW       I SCALR     00017 V        1     NNS       I SCALR     00018 V        1
NW        I SCALR      *00054 V    DUMMY     NX        I SCALR    *00051 V    DUMMY     NY        I SCALR    *00052 V    DUMMY
NZ        I SCALR      *00053 V    DUMMY     N1        I SCALR     00036 V        1     N2        I SCALR     00037 V        1
N3        I SCALR       00038 V        1     N4        I SCALR     00039 V        1     PLT       R ARRAY     00001 V       15
RLAT      R SCALR      *00059 V    DUMMY     RLATM     R SCALR     0004E V        1     RLØM      R SCALR     0004F V        1
RLØNG     R SCALR      *0005A V    DUMMY     STAT        SPRØG     EXTERN               STWIK     R SCALR     0003D V        1
VELW      R SCALR       0004C V        1     VMANT     R SCALR     0004B V        1     WGTN      R SCALR     0003F V        1
WGTW      R SCALR       00042 V        1


        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC
-----  -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
   10  0001C         12   00022         15   0006C         18   00086         19   000C6         20   000C9
   50  000D7         52   000F7         54   000FA         56   000FD         58   00100         60   000DA
   70  000EC         80   000E4        110   00119        120   0011C        900   00128        990   00053
  991  0009C


LØCAL VARIABLES (80 WØRDS):

   00000 GETP      00001 PLT       00010 IDESC     00016 K9        00017 NEW       00018 NNS
   00019 IIN       0001A IIØUT     0001B IREC1     0001C ISTA      0001D KEY       0001E LAT
   0001F LATM      00020 KNS       00021 LØNG      00022 LØM       00023 KEW       00024 J1
   00025 K1        00026 J2        00027 K2        00028 J3        00029 K3        0002A J4
   0002B K4        0002C J5        0002D K5        0002E J6        0002F K6        00030 J7
   00031 K7        00032 J8        00033 K8        00034 IMANT     00035 NELEV     00036 N1
   00037 N2        00038 N3        00039 N4        0003A MET       0003B IYR       0003C DINE
   0003D STWIK     0003E CRVN      0003F WGTN      00040 AVWTN     00041 CRVW      00042 WGTW
   00043 AVWTW     00044 I         00045 IBAC      00046 KDA       00047 KMØ       00048 KYR
   00049 ISTAØ     0004A ELEV      0004B VMANT     0004C VELW      0004D HEIGT     0004E RLA
   0004F RLØM

BLANK CØMMØN (0 WØRDS)
```

```
ENTRY PØINTS:

   00000 GETP

EXTERNAL SUBPRØGRAMS REQUIRED:

   CMTØR        EVIL        ISW         STAT        F:101       F:103       F:105       9BCDREAD
   9IØDATA      9IØLUSA     9ITØR       9SETLPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                         DEC       HEX
                        WØRDS     WØRDS
                        -----     -----
   GENERATED CØDE:        299     0012B
        CØNSTANTS:          4     00004
  LØCAL VARIABLES:         80     0005C
            TEMPS:         17     00011
                        -----     -----
    TØTAL PRØGRAM:        400     0019C
```

```
      SUBRØUTINE GETS(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,KGDA,KGMØ,KGYR,KGHM,IEØD)
C      VERSIØN 28 MAY 1974, C. DEAN, FØR 67 GRAVITY FØRMULA
C     VERSIØN ØF 22 JAN 1972, CØRRECTING RETURN INDICATIØN ØF EØF
C     VERSIØN ØF 19 JAN 1972, ADDING UNCØRRECTED DEPTHS TØ SELECTIØN VARIABLES
C
C  SUBRØUTINE GETS,  FØR READING SEAG1 FØRMAT
C
      DIMENSIØN PLT(20)
      DATA IFLAG/0/
      IF (IFLAG.NE.0) GØ TØ 50
      IFLAG = 1
C
C       SSW(3) UP TØ ADD CURRENT VELØCITIES TØ SHIP S VELØCITIES
C       SSW(12) UP TØ LIST DATE IDENTIFICATIØN
C
C     USES SUBRØUTINES ENDIØ(DUMMY), SHTV, EVIL, STAT
C     ASSUME STAT INITIALIZED IN MAIN PRØGRAM
C
      ØUTPUT ' GETS VERSIØN 28 MAY 1974 FØR 67 GRAVITY FØRMULA'
   10 IIØUT = 108
      IEØD=0
   50 CALL ENDIØ
   52 READ(ITAPE,12)IREC1,KGDA,KGMØ,KGYR,KGHM,IDIF,
     1 RLAT,RLØNG,KVN,KVE,K977,IØGR,KFA,KBG,KCVN,
     2 KCVE,KCDM,MTDC,MT,MAG1,MAG2,KETVØ
   12 FØRMAT(I1,3I2,I4,I3,2F9.6,2I5,I3,I4,5I5,
     1 I3,I2,I1,I4,I5)
      CALL STAT(I)
      CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)
      IF(IBAD)50,53,65
C  CØNVERTING TØ FLØATING PØINT
   53 XKCDM = KCDM .
      XKFA=FLØAT(KFA)*0.1
      XKBG=FLØAT(KBG)*0.1
      VN=FLØAT(KVN)*0.01
      VE=FLØAT(KVE)*0.01
      IF (IREC1-1) 55,56,55
   55 IF (IREC1-2) 60,70,60
C
C     CØNVERSIØN ØF  1930 INTERNATIØNAL GRAVITY FØRMULA TØ THAT ØF
C            THE 1967 INTERNATIØNAL GRAVITY FØRMULA
C                 AND NEW GEØDETIC REFERENCE SYSTEM.
C
   56 CONTINUE
      IØGR = IØGR - 14.0
      DG = 3.2-(13.6*(SIN(ABS(RLAT))**2))
      IF(XKFA-990.0) 57,58,58
   57 XKFA = XKFA + DG
   58 IF(XKBG-990.0) 59,70,70
   59 XKBG = XKBG + DG
      GØ TØ 70
   60 IF(IREC1-9)50,62,50
   62 READ(ITAPE,64)IREC9,IZ,IZ1,ITEST
   64 FØRMAT(I1,2I3,I4)
      IF(ITEST-6563)580,565,580
  565 WRITE(IIØUT,570)
  570 FØRMAT('EØR')
      GØ TØ 50
      580  IF(ITEST-6665)68,65,68
       65  IEØD=1
           RETURN
       68  WRITE(IIØUT,69)
       69  FØRMAT('IREC1=9')
           GØ TØ 50
       70  IF(ISW(12))73,73,71
       71  WRITE(IIØUT,72)KGDA,KGMØ,KGYR,KGHM
       72  FØRMAT('DATE=',3I3,I5)
       73  CØNTINUE
C   USE CURRENT VELØCITIES
           IF(ISW(3))80,80,75
       75  VN=VN+(FLØAT(KCVN)*0.1)
           VE=VE+(FLØAT(KCVE)*0.1)
       80  KK=0
           CALL SHTV(VN,VE,SPEED,XHEAD,KK)
           EØTV=FLØAT(KETVØ)*0.1
           TMAG=(MAG1*10000)+MAG2
           KMAG2=(MAG2/1000)*1000
           XMAG=MAG2-KMAG2
           XREG=0.0
           XKRES=0.0
           XLDM=KCDM-MTDC
           XLDF=XLDM*0.54681
           PLT(1)=KGHM
           PLT(2)=XKCDM
           PLT(3)=XKFA
           PLT(4)=XKBG
           PLT(5)=SPEED
           PLT(6)=XHEAD
           PLT(7)=EØTV
           PLT(8)=MT
           PLT(9)=XMAG
           PLT(10)=XREG
           PLT(11)=XKRES
           PLT(12)=-SPEED
           PLT(13)=-XKCDM
           PLT(14)=-EØTV
           PLT(15)=-XKFA
           PLT(16)=-XHEAD
           PLT(17)=TMAG
           PLT(18)=XLDM
           PLT(19)=XLDF
           KGDAØ=KGDA
           KGMØØ=KGMØ
           KGYRØ=KGYR
           KGHMØ=KGHM
C   CHECKING FØR INVALID VALUES
           IF(NX-2)105,607,606
      606  IF(NX-13)605,607,605
      607  IF(KCDM)105,10,105
      605  IF(NX-2)105,610,615
      610  IF(KFA-9980)105,10,10
      615  IF(NX-4)105,620,640
      620  IF(KBG-9980)105,10,10
      640  IF(NX-17)105,650,105
      650  IF(MAG1)10,10,105
C   SELECTING DATA TØ BE PLØTTED
      105  IF(NX)110,120,110
      110  DATAX=PLT(NX)
```

```
           120  DATAY=FLT(NY)
                DATAZ=FLT(NZ)
                DATAW=FLT(NW)
      X         OUTPUT DATAX
                RETURN
                END
```

```
                       HEX      DEC                                 HEX      DEC                                 HEX      DEC
NAME    TYPE CLASS     LOC      WORDS     NAME    TYPE CLASS        LOC      WORDS     NAME    TYPE CLASS        LOC      WORDS
----    ---- -----   -------    -----     ----    ---- -----      -------    -----     ----    ---- -----      -------    -----
ABS        R SPROG   INTRIN               DATAW      R SCALR    *0004A  V  DUMMY      DATAX      R SCALR    *00047  V  DUMMY
DATAY      R SCALR  *00048 V  DUMMY       DATAZ      R SCALR    *00049  V  DUMMY      DG         R SCALR     00032  V      1
ENDIO        SPROG   EXTERN               EOTV       R SCALR     0003A  V      1      EVIL         SPROG     EXTERN
FLOAT      R SPROG   INTRIN               GETS         SPROG     00000  P             GETS       R SCALR     00000  V      1
I          I SCALR   00027 V       1      IBAD       I SCALR     00028  V      1      IDIF       I SCALR     00018  V      1
IEOC       I SCALR  *00051 V  DUMMY       IFLAG      I SCALR     00015  V      1      IIOUT      I SCALR     00016  V      1
IOGR       I SCALR   0001C V       1      IREC1      I SCALR     00017  V      1      IREC9      I SCALR     00033  V      1
ISW        I SPROG   EXTERN               ITAPE      I SCALR    *00042  V  DUMMY      ITEST      I SCALR     00036  V      1
IZ         I SCALR   00034 V       1      IZ1        I SCALR     00035  V      1      KBG        I SCALR     0001E  V      1
KCDM       I SCALR   00021 V       1      KCVE       I SCALR     00020  V      1      KCVN       I SCALR     0001F  V      1
KETVO      I SCALR   00026 V       1      KFA        I SCALR     0001D  V      1      KGDA       I SCALR    *0004D  V  DUMMY
KGDAO      I SCALR   00029 V       1      KGHM       I SCALR    *00050 -V  DUMMY      KGHMO      I SCALR     0002C  V      1
KGMO       I SCALR  *0004E V  DUMMY       KGMOO      I SCALR     0002A  V      1      KGYR       I SCALR    *0004F  V  DUMMY
KGYRO      I SCALR   0002B V       1      KK         I SCALR     00037  V      1      KMAG2      I SCALR     0003C  V      1
KVE        I SCALR   0001A V       1      KVN        I SCALR     00019  V      1      K977       I SCALR     0001B  V      1
MAG1       I SCALR   00024 V       1      MAG2     . I SCALR     00025  V      1      MT         I SCALR     00023  V      1
MTDC       I SCALR   00022 V       1      NW         I SCALR    *00046  V  DUMMY      NX         I SCALR    *00043  V  DUMMY
NY         I SCALR  *00044 V  DUMMY       NZ         I SCALR    *00045  V  DUMMY      PLT        R ARRAY     00001  V     20
RLAT       R SCALR  *0004B V  DUMMY       RLONG      R SCALR    *0004C  V  DUMMY      SHTV         SPROG     EXTERN
SIN        R SPROG   INTRIN               SPEED      R SCALR     00038  V      1      STAT         SPROG     EXTERN
TMAG       R SCALR   0003B V       1      VE         R SCALR     00031  V      1      VN         R SCALR     00030  V      1
XHEAD      R SCALR   00039 V       1      XKBG       R SCALR     0002F  V      1      XKCDM      R SCALR     0002D  V      1
XKFA       R SCALR   0002E V       1      XKRES      R SCALR     0003F  V      1      XMAG       R SCALR     0003D  V      1
XREG       R SCALR   0003E V       1      XUDF       R SCALR     00041  V      1      XUDM       R SCALR     00040  V      1


        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
   10   00029       12   00049       50   0002D       52   0002F       53   00066       55   0007C
   56   0008C       57   0008F       58   00092       59   00035       60   00099       62   0009C
   64   000A4       65   000B6       68   000B9       69   000BD       70   000C2       71   000C7
   72   000CF       73   000C4       75   000D9       80   000E3      105   0015C      110   0015E
  120   00161      565   000AB      570   000AF      580   000B3      605   00147      606   00141
  607   00144      610   00148      615   0014F      620   00153      640   00157      650   0015A

LOCAL VARIABLES (66 WORDS):

   00000 GETS       00001 PLT        00015 IFLAG      00016 IIOUT      00017 IREC1      00018 IDIF
   00019 KVN        0001A KVE        0001B K977       0001C IOGR       0001D KFA        0001E KBG
   0001F KCVN       00020 KCVE       00021 KCDM       00022 MTDC       00023 MT         00024 MAG1
   00025 MAG2       00026 KETVO      00027 I          00028 IBAD       00029 KGDAO      0002A KGMOO
   0002B KGYRO      0002C KGHMO      0002D XKCDM      0002E XKFA       0002F XKBG       00030 VN
   00031 VE         00032 DG         00033 IREC9      00034 IZ         00035 IZ1        00036 ITEST
   00037 KK         00038 SPEED      00039 XHEAD      0003A EOTV       0003B TMAG       0003C KMAG2
   0003D XMAG       0003E XREG       0003F XKRES      0004C XUDM       00041 XUDF

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 GETS
```

```
INTRINSIC SUBPROGRAMS USED:

   ABS         FLOAT       SIN

EXTERNAL SUBPROGRAMS REQUIRED:

   ENDIO       EVIL        ISN         SHTV        STAT        F:101       F:102       [illegible]
   F:104       F:105       F:106       F:108       9BCDREAD    9BCDWRIT    9ENDIOL     9IODATA
   9ITOR       9PRINT      9RTOI       9SETUPN     9SIN

NUMBER OF X CARDS IGNORED: 1

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                     DEC        HEX
                    WORDS      WORDS
                    -----      -----
  GENERATED CODE:    363       0016B
       CONSTANTS:     10       0000A
 LOCAL VARIABLES:     66       00042
           TEMPS:     17       00011
                    -----      -----
   TOTAL PROGRAM:    456       001C8
```

```
      SUBRØUTINE GETST(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,JDA,JMØ,JYR,JHM,IEØD)
C
C          VERSIØN ØF 30 JUNE 1971
C   DUMMY RØUTINE WHILE AWAITING A WØRKING VERSIØN
C
       RETURN
       END
```

```
                          HEX     DEC                                    HEX     DEC                                    HEX     DEC
NAME   TYPE  CLASS        LØC     WØRDS        NAME   TYPE  CLASS        LØC     WØRDS        NAME   TYPE  CLASS        LØC     WØRDS
----   ----  -----      ------- -----          ----   ----  -----      ------- -----          ----   ----  -----      ------- -----
DATAW        UNUSED*00009 V DUMMY              DATAX        UNUSED*00006 V DUMMY              DATAY        UNUSED*00007 V DUMMY
DATAZ        UNUSED*00008 V DUMMY              GETST        SPRØG   00000 P                   GETST      R SCALR   00000 V      1
IEØC         UNUSED*00010 V DUMMY              ITAPE        UNUSED*00001 V DUMMY              JDA          UNUSED*0000C V DUMMY
JPM          UNUSED*0000F V DUMMY              JMØ          UNUSED*0000D V DUMMY              JYR          UNUSED*0000E V DUMMY
NW           UNUSED*00005 V DUMMY              NX           UNUSED*00002 V DUMMY              NY           UNUSED*00003 V DUMMY
NZ           UNUSED*00004 V DUMMY              RLAT         UNUSED*0000A V DUMMY              RLØNG        UNUSED*0000B V DUMMY

LØCAL VARIABLES (1 WØRD):

   00000 GETST

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GETST

EXTERNAL SUBPRØGRAMS REQUIRED:

   9SETLPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC       HEX
                   WØRDS     WØRDS
                   -----     -----
 GENERATED CØDE:     20      00014
      CØNSTANTS:      0      00000
LØCAL VARIABLES:      1      00001
          TEMPS:     17      00011
                   -----     -----
  TØTAL PRØGRAM:     38      00026
```

```
      SUBRØUTINE GETV(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1 RLAT,RLØNG,KGDA,KGMØ,KGYR,KGHM,IEØD)
C     VERSIØN ØF 29 JUNE 1971
C
C SUBRØUTINE GETV,  READS WØRLD VØLCANØE CATALØGUE CØMPILATIØN
C
      DIMENSIØN PLT(5)
      DIMENSIØN ID(5)
  400 IIN = 105
      IIØUT = 108
      IEØD=0
       KGDA=0
  410 CØNTINUE
      READ(ITAPE,74)IAREA,ICØM,ISUBA,IDASH,INØ,LAT,RLATM,KNS,
     1  LØNG,RLØM,KEW,IHEIT,IPT,IPAGE,ITYPE,ICHEM,ID
   74 FØRMAT(I3,A1,I2,A1,I2,1X,I2,F5.2,A1,1X,I3,F5.2,A1,1X,
     1   I5,1X,I2,1X,I3,1X,A1,1X,A1,15X,5A4)
      CALL STAT(I)
      CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)
      IF(IBAD)410,53,900
 53    CØNTINUE
      KGMØ=IAREA
      KGYR=ISUBA
      KGHM=INØ
       CALL NAVIN(LAT,RLATM,KNS,LØNG,RLØM,KEW,RLAT,RLØNG)
      KGDAØ=KGDA
      KGMØØ=KGMØ
      KGYRØ=KGYR
      KGHMØ=KGHM
      PLT(1) = INØ
      PLT(2) = IHEIT
      PLT(3) = (IPT*1000) + IPAGE
      IF(NX)80,85,80
   80 DATAX=PLT(NX)
   85 DATAY=PLT(NY)
      DATAZ=IHEIT
      DATAW=INØ
      RETURN
  900 IEØD=1
      RETURN
      END
```

```
                        HEX     DEC                                 HEX     DEC                                HEX     DEC
NAME   TYPE CLASS       LØC     WØRDS      NAME   TYPE CLASS        LØC     WØRDS      NAME   TYPE CLASS       LØC     WØRDS
----   ---- -----    -------   -----      ----   ---- -----     -------   -----      ----   ---- -----    -------   -----
DATAW     R SCALR   *0002B V  DUMMY       DATAX     R SCALR    *00028 V  DUMMY      DATAY     R SCALR   *00029 V  DUMMY
DATAZ     R SCALR   *0002A V  DUMMY       EVIL        SPRØG     EXTERN              GETV      R SCALR    00000 V      1
GETV        SPRØG    00000 F              I         I SCALR     0001D V      1      IAREA     I SCALR    0000D V      1
IBAD      I SCALR    0001E V      1       ICHEM     I SCALR     0001C V      1      ICØM      I SCALR    0000E V      1
ID        I ARRAY    00006 V      5       IDASH     I SCALR     00010 V      1      IEØD      I SCALR   *00032 V  DUMMY
IHEIT     I SCALR    00018 V      1       IIN       I SCALR     0000B V      1      IIØUT     I SCALR    0000C V      1
INØ       I SCALR    00011 V      1       IPAGE     I SCALR     0001A V      1      IPT       I SCALR    00019 V      1
ISUBA     I SCALR    0000F V      1       ITAPE     I SCALR    *00023 V  DUMMY      ITYPE     I SCALR    0001B V      1
KEW       I SCALR    00017 V      1       KGDA      I SCALR    *0002E V  DUMMY      KGDAØ     I SCALR    0001F V      1
KGHM      I SCALR   *00031 V  DUMMY       KGHMØ     I SCALR     00022 V      1      KGMØ      I SCALR   *0002F V  DUMMY
KGMØØ     I SCALR    00020 V      1       KGYR      I SCALR    *00030 V  DUMMY      KGYRØ     I SCALR    00021 V      1
KNS       I SCALR    00014 V      1       LAT       I SCALR     00012 V      1      LØNG      I SCALR    00015 V      1
NAVIN       SPRØG    EXTERN               NW          UNUSED*00027 V  DUMMY      NX        I SCALR   *00024 V  DUMMY
NY        I SCALR   *00025 V  DUMMY       NZ          UNUSED*00026 V  DUMMY      PLT       R ARRAY    00001 V      5
RLAT      R SCALR   *0002C V  DUMMY       RLATM     R SCALR     00013 V      1      RLØM      R SCALR    00016 V      1
RLØNG     R SCALR   *0002D V  DUMMY       STAT        SPRØG     EXTERN


        HEX                 HEX                 HEX                 HEX                 HEX                 HEX
LABEL   LØC         LABEL   LØC         LABEL   LØC         LABEL   LØC         LABEL   LØC         LABEL   LØC
-----   -----       -----   -----       -----   -----       -----   -----       -----   -----       -----   -----
   53   00057          74   00032          80   0007C          85   0007F         400   00013         410   0001B
  900   00085


LØCAL VARIABLES (35 WØRDS):

   00000 GETV        00001 PLT         00006 ID          0000B IIN         0000C IIØUT       0000D IAREA
   0000E ICØM        0000F ISUBA       00010 IDASH       00011 INØ         00012 LAT         00013 RLATM
   00014 KNS         00015 LØNG        00016 RLØM        00017 KEW         00018 IHEIT       00019 IPT
   0001A IPAGE       0001B ITYPE       0001C ICHEM       0001D I           0001E IBAD        0001F KGDAØ
   00020 KGMØØ       00021 KGYRØ       00022 KGHMØ

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GETV

EXTERNAL SUBPRØGRAMS REQUIRED:

   EVIL        NAVIN       STAT        F:101       F:103       F:105       9BCDREAD    9IØDA A
   9IØLUSA     9ITØR       9SETUPN
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC       HEX
                    WØRDS     WØRDS
                    -----     -----
  GENERATED CØDE:     140     0008C
       CØNSTANTS:       0     00000
 LØCAL VARIABLES:      35     00023
           TEMPS:      17     00011
                    -----     -----
   TØTAL PRØGRAM:     192     000C0
```

```
      SUBRØUTINE GETX(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1  RLAT,RLØNG,KGDA,KGMØ,KGYR,KGHM,IEØD)
C
C        VERSIØN ØF 26 SEPT 1972,  DUMMY RØUTINE
C  SUBRØUTINE GETX,  FØR READING VARIABLE DATA INPUT, WRITE YØUR
C             ØWN GETX RØUTINE
      DIMENSIØN PLT(10)
      IIN = 105
      IIØUT=108
      IEØD=0
       KGDA=0
      KGMØ=0
       ØUTPUT ' SUBRØUTINE GETX IS A DUMMY RØUTINE, CALL EXIT'
      CALL EXIT
      RETURN
      END
```

```
                        HEX     DEC                              HEX     DEC                              HEX     DEC
NAME   TYPE CLASS       LØC     WØRDS     NAME   TYPE CLASS      LØC     WØRDS     NAME   TYPE CLASS      LØC     WØRDS
----   ---- -----     ------- -----       ----   ---- -----    ------- -----      ----   ---- -----    ------- -----
DATAW       UNUSED*00015 V DUMMY          DATAX       UNUSED*00012 V DUMMY         DATAY       UNUSED*00013 V DUMMY
DATAZ       UNUSED*00014 V DUMMY          EXIT        SPRØG  EXTERN                GETX      R SCALR  00000 V       1
GETX        SPRØG  00000 F                IEØD      I SCALR *0001C V DUMMY         IIN       I SCALR  0000B V       1
IIØLT     I SCALR  0000C V       1        ITAPE       UNUSED*0000D V DUMMY         KGDA      I SCALR *00018 V DUMMY
KGHM        UNUSED*0001B V DUMMY          KGMØ      I SCALR *00019 V DUMMY         KGYR        UNUSED*0001A V DUMMY
NW          UNUSED*00011 V DUMMY          NX          UNUSED*0000E V DUMMY         NY          UNUSED*0000F V DUMMY
NZ          UNUSED*00010 V DUMMY          PLT       R ARRAY  00001 V      10       RLAT        UNUSED*00016 V DUMMY
RLØNG       UNUSED*00017 V DUMMY

LØCAL VARIABLES (13 WØRDS):

   00000 GETX       00001 PLT        0000B IIN        0000C IIØUT

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GETX

EXTERNAL SUBPRØGRAMS REQUIRED:

   EXIT       F:108      9ENDIØL    9PRINT     9SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC     HEX
                   WØRDS   WØRDS
                   -----   -----
 GENERATED CØDE:     49    00031
      CØNSTANTS:      0    00000
LØCAL VARIABLES:     13    0000D
          TEMPS:     17    00011
                   -----   -----
  TØTAL PRØGRAM:     79    0004F
```

```
C      SUBROUTINE GETY OF MARCH 19,1972
C MODIFIED  MARCH 19,1972 BY FOLINSBEE TO READ NEW CGSDATA EPICENTER
C        FORMAT - ONLY READS IN THE NECESSARY VALUES
        SUBROUTINE GETY(ITAPE,NX,NY,NZ,NW,DATAX,DATAY,DATAZ,DATAW,
     1  RLAT,RLONG,KDA,KMO,KYR,KHM,IEOD)
C   SN AND WE  WERE MASDE  INTO INTEGER S FOR COMPATIBLITY WITH THE SIG-7
C   USAGE OF ALPHA NUMERICS
       INTEGER SN,WE
        DIMENSION PLT(5)
       DATA IFLAG/0/
        IF(IFLAG-1) 400,410,400
  400   IIN = 105
        IIOUT = 108
        IFLAG=1
        KL=0
   410  CONTINUE
        IEOD=0
 411    CONTINUE
       READ(ITAPE,65)
      * KDA,KMO,KYR,KHM      ,DLAT,KSN,DLON,KWE, DEPT, AMAG
        CALL STAT(I)
        CALL EVIL (IIOUT,I,IBAD,KGDAO,KGMOO,KGYRO,KGHMO)
        IF(      IBAD) 411,53,900
 53     CONTINUE
 65     FORMAT (6X,I2,I2,I2,I4,3X,  F5.3,A1,F6.3,A1,F3.0,F3.2)
        KGDAO=KDA
        KGMOO=KMO
        KGYRO=KYR
        KGHMO=KHM
        CALL        DNAV(DLAT,KSN,DLON,KWE,RLAT,RLONG,KL)
        PLT(1)=KDA*10000+KMO*100+KYR
        PLT(1)=(MTH*1000)+(KDA*10)+IY
        PLT(2)=DEPT
        PLT(3)=AMAG
        IF(NX)80,85,80
    80  DATAX=PLT(NX)
    85  DATAY=PLT(NY)
        DATAZ=DEPT
        DATAW=AMAG
        RETURN
   900  IEOD=1
        RETURN
        END
```

```
                          HEX     DEC                                  HEX     DEC                                  HEX     DEC
NAME    TYPE CLASS        LOC     WORDS        NAME    TYPE CLASS        LOC     WORDS        NAME    TYPE CLASS        LOC     WORDS
----    ---- -----    -------- -----        ----    ---- -----    -------- -----        ----    ---- -----    -------- -----
AMAG       R SCALR     0000F V      1        DATAW      R SCALR   *0002C V DUMMY        DATAX      R SCALR   *0001D V DUMMY
DATAY      R SCALR    *0001E V DUMMY        DATAZ      R SCALR   *0001F V DUMMY        DEPT       R SCALR    0000E V      1
DLAT       R SCALR     0000A V      1        DLON       R SCALR    0000C V      1        DNAV         SPROG    EXTERN
EVIL         SPROG    EXTERN                 GETY         SPROG    00000 P              GETY       R SCALR    00000 V      1
I          I SCALR     00010 V      1        IBAD       I SCALR    00011 V      1        IEOD       I SCALR   *00027 V DUMMY
IFLAG      I SCALR     00006 V      1        IIN        I SCALR    00007 V      1        IIOUT      I SCALR    00008 V      1
ITAPE      I SCALR    *00018 V DUMMY        IY         I SCALR    00017 V      1        KDA        I SCALR   *00023 V DUMMY
KGDAO      I SCALR     00012 V      1        KGHMO      I SCALR    00015 V      1        KGMOO      I SCALR    00013 V      1
KGYRO      I SCALR     00014 V      1        KHM        I SCALR   *00026 V DUMMY        KL         I SCALR    00009 V      1
KMO        I SCALR    *00024 V DUMMY        KSN        I SCALR    0000B V      1        KWE        I SCALR    0000D V      1
KYR        I SCALR    *00025 V DUMMY        MTH        I SCALR    00016 V      1        NW           UNUSED*0001C V DUMMY
NX         I SCALR    *00019 V DUMMY        NY         I SCALR   *0001A V DUMMY        NZ           UNUSED*0001B V DUMMY
PLT        R ARRAY     00001 V      5        RLAT       R SCALR   *00021 V DUMMY        RLONG      R SCALR   *00022 V DUMMY
SN         I UNUSED                          STAT         SPROG    EXTERN               WE         I UNUSED

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC
-----  -----     -----  -----     -----  -----     -----  -----     -----  -----     -----  -----
   53  0003C        65  0003D        80  00073        85  00076       400  00016       410  0001E
  411  0002C       900  0007E

LOCAL VARIABLES (24 WORDS):

   00000 GETY      00001 PLT       00006 IFLAG     00007 IIN       00008 IIOUT     00009 KL
   0000A DLAT      0000B KSN       0000C DLON      0000D KWE       0000E DEPT      0000F AMAG
   00010 I         00011 IBAD      00012 KGDAO     00013 KGMOO     00014 KGYRO     00015 KGHMO
   00016 MTH       00017 IY

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 GETY .

EXTERNAL SUBPROGRAMS REQUIRED:

   DNAV      EVIL      STAT      F:101     F:103     F:105     9BCDREAD  9IODATA
   9ITOR     9SETUPN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                    DEC       HEX
                   WORDS     WORDS
                   -----     -----
  GENERATED CODE:    129     00081
       CONSTANTS:      0     00000
 LOCAL VARIABLES:     24     00018
           TEMPS:     18     00012
                   -----     -----
   TOTAL PROGRAM:    171     000AB
```

```
      SUBROUTINE GINOT(ITAPE,JTAPE,KK,KGCA,KGMO,                        GINO0000
     1   KGYR,KGHM,IDIF,ISORC,RLAT,RLONG,ELEV,K977,OBSG,
     2   IDEP,FA,BG,TC,IELC,IGC,RFA,IREGC,IFFC,IA,IFBC)
C     VERSION 8 MAY 1975,  ADD INITIALIZATION ZEROS AND
C                           OUTPUT COMMENTS ON GRAVITY FORMULA
C      VERSION OF 11 DEC 1974, TO ADD HANDLING OF PROJ4 OUTPUT
C     VERSION  1 OCT 1974, FOR 1967 GRAVITY FORMULA
C     VERSION OF 26 JULY 1973, START CONVERSION TO 1967 G FORMULA
C     VERSION OF 26 APR 72
C           TEMPORARY MODIF DUE TO BACKWARD CODE / MANAGE
C    VERSION OF 27 DECEMBER 71
C     VERSION OF 22 DECEMBER 1971
C     GINOT VERSION NOV 12,1971
C     INPUT , NEW GSUM FORMAT =
C                      PREVIOUS GSUM FORMAT
C                        + 3 KEYS : LTKEY , LGKEY , IAKEY
C     OUTPUT . NEW GSUM FORMAT
C     MODIF ON NOV 12,1971 BY MONGET J.M. TO INCLUDE :
C           - USE OF DATA LOCATION TABLE
C           - USE OF LABEL TAPES
C MOD AUG 16 1971 BY FOLINSBEE TO CORRECT ERROR ON CALLING ARGS OF GBLKI
C VERSION OF JUNE 29,71 DOES NOT WRITE EOF ONTO OUTPUT DEVICE
C      MODIFIED JUNE 28 TO  READ( OR WRITE) BLOCKED DATA  BY A FOLINSBEE
C   VERSION OF APRIL 16 TO OPTIONALLY SUPRESS REWIND OF ITAPE AND JTAPE GINO0040
C                                                                       GINO0050
C                                                                       GINO0080
C  SUBROUTINE GINOT, FOR GSUM FORMATTED DATA                            GINO0090
C                                                                       GINO0100
C                                                                       GINO0110
C    VERSION WITH DESIGNATION OF INPUT AND OUTPUT MAGNETIC TAPES        GINO0120
C          BY USE OF SUBROUTINE MOUNT                                   GINO0130
C                                                                       GINO0140
C                                                                       GINO0150
C       SSW(12) UP TO LIST DATE IDENTIFICATION
C       SSW(26) UP TO OUTPUT ON HIGH SPEED PRINTER ONLY                 GINO0180
C       SSW(27) UP TO SUPRESS REWIND OF TAPES AT START OF JOB
C         =1 SUPRESS REWIND OF ITAPE                                    GINO0240
C         =2  SUPRESS REWIND OF JTAPE                                   GINO0250
C         =9 SUPRESS RWIND OF BOTH ITAPE AND JTAPE                      GINO0260
C     SSW(29) = 1 - TO READ AND TEST FOR SELECTED SOURCE CODE
C                             NUMBERS TO BE PROCESSED
C      = 2 - TO READ AND TEST FOR SELECTED SOURCE CODES
C                           NUMBERS TO BE SKIPPED
C       SSW(30) UP FOR INPUT DATA ON CARDS                              GINO0190
C       SSW(31) UP TO OUTPUT DATA ON CARDS                              GINO0200
C     SSW(40) UP TO PROCESS WITH BOUNDS USING DLT
C           = 0  - PROCESS WITHOUT BOUNDS
C           = 1  - PROCESS WITH BOUNDS USING THE DATA LOCATION TABLE
C      SSW(60) UP TO PROCESS ONLY DATA WITH IFFC=4,  ABSTRACTER OUTPUTGINO0210
C      SSW(61) UP TO REPLACE FA,BG,ELEV,LAT,LONG WITH AVERAGED VALUES
C                                                                       GINO0270
C     USES ENDIO(DUMMY), EVIL, STAT, ISW                                GINO0280
C     ASSUME ISW AND STAT INITIALIZED IN MAIN PROGRAM                   GINO0290
C                                                                       GINO0300
C                                                                       GINO0310
      DIMENSION IDTIN(20),IBK(20),ITK(20),IDENS(20),IDESC(17,20)        GINO0320
      DIMENSION IDTOT(20),JBK(20),JTK(20),JDENS(20),JDESC(17,20)        GINO0330
      DIMENSION PLT(20),IA(35),IAFMT(9),IASH(35),ISRC(16)
       DATA ITERI,ITERO/'EITP','EOTP'/                                  GINO0360
      IF(KK)420,400,410                                                 GIN80370
C
C ------     GSUM INITIALISATION LOGIC
C
 400  IIN = 105                                                         GIN80380
      IIOUT = 108                                                       GIN80390
      IFUN=106                                                          GIN80400
      IDISC = 100
C                                                                       GIN80410
      DEGRA=1.745329E-2
      RADEG=57.29578
C     NEF = NO. OF FILE NOW BEING PROCESSED                             GIN80530
      NEF = 1
      IFILE = 1
C     NRECT = NO. OF RECORDS NOW WRITTEN ON PRESENT OUTPUT TAPE         GIN80520
      NRECT = NZERO                                                     GIN80540
C                                                                       GIN80430
      OUTPUT 'GINOT OF 8 MAY 1975'
      MAXCT = 125000
      ILI=101 ; IDL=100
      IF(ISW(40).NE.0)CALL ENDLT(J,DLATO,DLABO,DLOLE,DLORI,IDL,ILI,0)
     *  ;  CALL SETSKP(INDICA) ; IDLT=0
     *  ; NEF=1  ;  IFILE=J-1
      OUTPUT NEF,IFILE
      NZERO=0                                                           GIN80470
       KGDAO=NZERO                                                      GIN80480
       KGMOO=NZERO                                                      GIN80490
       KGYRO=NZERO                                                      GIN80500
       KGHMO=NZERO                                                      GIN80510
      IREC1 = 1                                                         GIN80550
      IREC2=2
      IRECIN = 0
C                                                                       GIN80560
C
C ------     CHECK SSW(29) TO SEE IF SOURCE CODE NUMBERS
C ------     ARE TO BE READ FOR DATA SELECTION
C
  407 IF(ISW(29).EQ.0)GO TO 1405
      READ(IIN,900)ISRC
  900 FORMAT(16I5)
      IF(ISW(29).EQ.1)WRITE(IIOUT,912)ISRC;GO TO 1405
      WRITE(IIOUT,913)ISRC
  913 FORMAT(1H0,10X,'SKIPPED SOURCE CODES = ',16I5)
  912 FORMAT(1H0,10X,'SELECTED SOURCE  CODES = ',16I5)
C
C ------
C
 1405 IF(ISW(40).NE.0)GO TO 720
      IF(ISW(30))404,404,720
 404  J=1                                                               GIN80580
 405  READ (IIN,406) IDTIN(J),IBK(J),ITK(J),IDENS(J),                   GIN80590
     1        (IDESC(K,J),K=1,17)                                       GIN80600
 406  FORMAT(A4,1X,A1,1X,I1,1X,I3,17A4)                                 GIN80610
       IF(IDTIN(J).NE.ITERI) J=J+1; GO TO 405                           GIN80620
       NEF=1                                                            GIN80630
       IFILE=J - 1                                                      GIN80640
       OUTPUT NEF,IFILE                                                 GIN80650
  720 IF(ISW(31))408,408,1410
  408  J=1                                                              GIN80670
 409  READ (IIN,406) IDTOT(J),JBK(J),JTK(J),JDENS(J),                   GIN80680
```

```
     1      (JDESC(K,J),K=1,17)                                          GINØ0690
      IF(IDTØT(J).NE.ITERØ) J=J+1; GØ TØ 409                             GINØ0700
      NEND=1                                                             GINØ0710
      JFILE=J - 1                                                        GINØ0720
      ØUTPUT NEND,JFILE                                                  GINØ0730
 1410 IF(ISW(30))1412,1412,1414                                          GINØ0740
1412   CONTINUE                                                          GINØ0750
     IF(ISW(40).EQ.0)GØTØ810
     READ(IDISC,406)IDTIN(1),IBK(1),ITK(1),IDENS(1),
    *  (IDESC(K,1),K=1,17)
  810 IF(IDTIN(1).EQ.ITERI)GØTØ1414
      CALL MØUNT(ITAPE,IDTIN(1))                                         GINØ0770
     WRITE (IIØUT,1413) IDTIN(1),IBK(1),ITK(1),IDENS(1),                 GINØ0780
     1      (IDESC(K,1),K=1,17)                                          GINØ0790
 1413 FØRMAT (1X,A4,1X,A1,1X,I1,1X,I3,17A4)                              GINØ0800
      IF(ISW(27).EQ.1 .ØR. ISW(27).EQ.9) GØTØ 2414                       GINØ0810
     REWIND ITAPE                                                        GINØ0820
2414   CONTINUE                                                          GINØ0830
 1414  IF(ISW(31))1416,1416,1418                                         GINØ0840
1416   CONTINUE                                                          GINØ0850
      IF(IDTØT(1).EQ.ITERØ) GØ TØ 1418                                   GINØ0860
      CALL MØUNT(JTAPE,IDTØT(1))                                         GINØ0870
     WRITE (IIØUT,1413) IDTØT(1),JBK(1),JTK(1),JDENS(1),                 GINØ0880
     1      (JDESC(K,1),K=1,17)                                          GINØ0890
      IF (ISW(27).EQ.2 .ØR. ISW(27).EQ. 9) GØ TØ 1418                    GINØ0900
     REWIND JTAPE                                                        GINØ0910
 1418   CONTINUE                                                         GINØ0920
      RETURN                                                             GINØ0930
C
C ------ GSUM INPUT LØGIC
C
  410  CONTINUE                                                          GINØ0940
   50  CALL ENDIØ                                                        GINØ0950
      IF(ISW(30).EQ.1)  GØ TØ 100                                        GINØ0960
      IF(ISW(40).NE.0) GØ TØ 700
   52  READ(ITAPE,11)IREC1,ISØRC,KGDA,KGMØ,KGYR,KGHM,
     1   DLAT,DLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,TC,IELC,IGC,
     2   RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
     GØ TØ 101                                                           GINØ1020
100  CONTINUE                                                            GINØ1030
       READ(IIN ,469 )IREC1,ISØRC,KGDA,KGMØ,KGYR,KGHM,
     1   DLAT,DLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,TC,IELC,IGC,
     2   RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
101  CONTINUE                                                            GINØ1090
      CALL STAT(I)                                                       GINØ1100
710   CONTINUE                                                           GINØ1110
      CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)                    GINØ1110
      IF (IBAD) 50, 53, 575                                              GINØ1120
C
C        CHECKING IF IREC = 2 ØR 1
C
   53 IF(IREC1.NE.2)   GØ TØ 600
      IF(IRECIN.EQ.0)  ØUTPUT 'INPUT ALREADY IN  1967 GRAV FØRMULA'
      IRECIN = 1
      GØ TØ 70
  600 IF(IREC1=1)601,610,601
  601 IF(IREC1.EQ.8)KK=8;RETURN
      IF(IREC1.EQ.9)KK=9;RETURN
      GØ TØ 50
C
```

```
C          CONVERSION OF 1930 INTERNATIONAL GRAVITY FORMULA TO THAT OF
C                  THE 1967 INTERNATIONAL GRAVITY FORMULA
C                          AND NEW GEODETIC REFERENCE SYSTEM
C
  610 CONTINUE
        IF (IRECIN.EQ.0) OUTPUT 'CONVERTING TO 1967 GRAV FORMULA NOW'
        IRECIN = 1
         KK = 1
        CALL OBG (K977,OBSG,GOBS,KK)
       GOBS=GOBS-14.0
         KK = -2
        CALL OBG (K977,OBSG,GOBS,KK)
        RLAT = DLAT*DEGRA
       DG=3.2-(13.6*(SIN(ABS(RLAT))**2))
        IF(FA-990.0) 611,612,612
  611 FA=FA+DG
  612  IF(BG-990.0) 613,70,70
  613 BG=BG+DG
       GO TO 70
 575   IF (NEF - IFILE) 576, 577, 577                                   GIN01240
 576    NEF = NEF + 1                                                   GIN01250
       IF(ISW(40).EQ.0)GOTO820
       READ(IDISC,406)IDTIN(NEF),IBK(NEF),ITK(NEF),IDENS(NEF),
     *  (IDESC(K,NEF),K=1,17)
  820 CALL MOUNT(ITAPE,IDTIN(NEF))
       WRITE (IIOUT,1413) IDTIN(NEF),IBK(NEF),ITK(NEF),IDENS(NEF),      GIN01270
     1         (IDESC(K,NEF),K=1,17)                                    GIN01280
       REWIND ITAPE                                                     GIN01290
        GO TO 50                                                        GIN01300
C       END OF INPUT DATA, REQUIRED NO. OF FILES NOW PROCESSED          GIN01310
  577 KK=9 ; RETURN
   70  IF(ISW(12))73,73,71                                              GIN01390
   71  WRITE(IIOUT,72)KGDA,KGMO,KGYR,KGHM                               GIN01400
   72  FORMAT('DATE=',3I3,I5)                                           GIN01410
   73 IF(ISW(29).EQ.0)GOTO1730
       IF(ISW(29).EQ.2)GOTO1700
C
C ------       PROCESS ONLY SELECTED SOURCE CODES
C
       DO1650J=1,16
       IF(ISRC(J).EQ.0)GOTO50
       IF(ISORC-ISRC(J))1650,1730,1650
 1650  CONTINUE
       GOTO50
C
C ------       IGNORE SELECTED SOURCE CODES
C
 1700 DO1710J=1,16
       IF(ISRC(J).EQ.0)GOTO1730
       IF(ISORC-ISRC(J))1710,50,1710
 1710 CONTINUE
C
C ------
C
 1730 RLAT=DLAT*DEGRA
       RLONG = DLONG*DEGRA
         IF(ISW(60))418,418,800
C  USE DATA ONLY FOR IFFC = 4  (IE. ABSTRACTER OUTPUT)                  GIN01440
  800  IF(IFFC-4)50,801,50                                              GIN01450
  801  CONTINUE                                                         GIN01460
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```
         IF(ISW(61))109,109,105
C  SET FA, BG, AND ELEV =  AVERAGED VALUES FROM ABSTRACTER OUTPUT         GIN01480
C  SET LAT AND LONG  TO VALUES AT CENTER OF GRID AREA                     GIN01490
  105    CONTINUE                                                         GIN01500
         DO 802 JK=1,35                                                   GIN01510
  802    IASH(JK)=ISL(IA(JK),-24)                                         GIN01520
         CALL PKBY(IASH,IAFMT,35)                                         GIN01530
         DECODE(35,803,IAFMT) CLAT,CLONG,AHEIGT,KAFA,KABG                 GIN01540
  803    FORMAT(2F9.6,F7.0,2I5)                                           GIN01550
         RLAT=CLAT*DEGRA
         RLONG=CLONG*DEGRA
         AFA=FLOAT(KAFA)*0.1                                              GIN01580
         ABG=FLOAT(KABG)*0.1                                              GIN01590
         FA=AFA                                                           GIN01600
         BG=ABG                                                           GIN01610
         ELEV=AHEIGT                                                      GIN01620
         NUMO=IFBC                                                        GIN01630
  109    CONTINUE                                                         GIN01640
  418    CONTINUE                                                         GIN01650
         KGDAO=KGDA                                                       GIN01660
         KGMOO=KGMO                                                       GIN01670
         KGYRO=KGYR                                                       GIN01680
         KGHMO=KGHM                                                       GIN01690
         RETURN                                                           GIN01700
C
C ------------ GSUM OUTPUT LOGIC
C
  420    CALL ENDIO                                                       GIN01710
        CLAT=RLAT*RADEG
        CLONG=RLONG*RADEG
        PLAT=DLAT+90. ; LTKEY=PLAT
        PLONG=CLONG+180. ; LGKEY=PLONG
        CALL AREAK(DLAT,DLONG,IAKEY)
         IF(ISW(31).EQ.1)  GO TO 110                                      GIN01720
         IF(JTAPE.EQ.108) IREC2=C
         IF(ISW(26).EQ.1) IREC2=C;JTAPE=108
         WRITE(JTAPE,11)IREC2,ISORC,KGDA,KGMO,KGYR,KGHM,
       1  CLAT,CLONG,ELEV,K977,OBSG,IDEP,FA,BG,TC,IELC,IGC,
       2  RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
   11    FORMAT(I1,I4,3I2,I4,2F9.4,F7.2,I3,F6.2,I5,2F6.1,F4.1,
       1   2I2,F6.1,I1,I2,35A1,1X,I1,2I3,I2)
         NRECT = NRECT + 1                                                GIN01800
         IF (NRECT - MAXCT) 85, 90, 90                                    GIN01810
   85    RETURN                                                           GIN01820
  110    CONTINUE                                                         GIN01830
         WRITE(IPUN,469) IREC2,ISORC,KGDA,KGMO,KGYR,KGHM,
       1  CLAT,CLONG,ELEV,K977,OBSG,IDEP,FA,BG,TC,IELC,IGC,
       2  RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
  469    FORMAT(I1,I4,3I2,I4,2F9.4,F7.2,I3,F6.2,I5,2F6.1,F4.1,
       1   2I2,F6.1/10X,I1,I2,35A1,1X,I1,2I3,I2)
        RETURN                                                            GIN01870
   90    NRECT = NZERO                                                    GIN01880
         WRITE (IIOUT, 91)                                                GIN01900
   91    FORMAT ('MAXCT OUTPUT')                                          GIN01910
         END FILE JTAPE                                                   GIN01920
         REWIND JTAPE                                                     GIN01930
         NEND=NEND+1                                                      GIN01940
         IF(NEND-JFILE)990,990,995                                        GIN01950
  990    CALL MOUNT(JTAPE,IDTOT(NEND))                                    GIN01960
        WRITE (IIOUT,1413) IDTOT(NEND),JBK(NEND),JTK(NEND),JDENS(NEND),   GIN01970
```

```
     1       (JDESC(K,NEND),K=1,17)                                   GIN01980
      REWIND JTAPE                                                    GIN01990
       GØ TØ 999                                                      GIN02000
  995  WRITE(IIØUT,902)NEND                                           GIN02010
   902 FØRMAT('NEND EXCEEDS JFILE,  NEND = ', I6)                     GIN02020
      KK=9 ; RETURN
 999   CØNTINUE                                                       GIN02040
   500 RETURN                                                         GIN02050
C
C ------      GSUM DLT INPUT LØGIC
C
700    CØNTINUE
      IF(IDLT.EQ.1)GØTØ821
      READ(IDISC,812)NMAX ; IPRE = NMAX ; NPRE=1
  812 FØRMAT(I6)
  322 CØNTINUE
      READ(IDISC,321,END=331)NBLØ,ILAST,LASTR,ØLMAX,ØLMIN
  321 FØRMAT(4X,I6,I6,I3,2F9.4)
      IF(NBLØ.EQ.0)IDLT=0 ; GØTØ575
      ALMIN=FLØAT(LASTR-90)
      ALMAX=ALMIN+1.
      ØLARG=ØLMAX-ØLMIN
      CLØUP=CLØRI+ØLARG
      CLØDØ=CLØLE-ØLARG
      IF((CLØUP.GE.ØLMAX).AND.(CLØDØ.LE.ØLMIN))GØTØ323
      IPRE=ILAST
      GØTØ322
  323 CLAUP=CLATØ+1.
      CLADØ=CLABØ-1.
      IF((CLAUP.GE.ALMAX).AND.(CLADØ.LE.ALMIN))GØTØ324
      IF(ALMAX.LT.CLADØ)GØTØ343
      IPRE=ILAST
      GØTØ322
  324 IF(IPRE.EQ.NMAX)GØTØ325
      IBEG=IPRE+1
      GØTØ326
  325 IBEG=1
C ------      NINF = INDEX FIRST REC. TØ READ
C ------      NSUP = INDEX LAST REC. TØ READ
  326 NFIR = NMAX*(NBLØ-1)
      NINF=NFIR+IBEG
      NSUP=NFIR + ILAST
C ------ AVØID TRYING  TØ READ REC. WHICH ARE ALREADY PRØCESSED
      IF(NINF.LT.NPRE)NINF=NPRE
      NSKIP=NINF-NPRE
      CALL SKPREC(ITAPE,NSKIP,'FWD')
      GØTØ(330,330,331,332,333)INDICA
      GØTØ(330,331,332,333)INDICA
  330 CØNTINUE
      NPRE=NSUP+1
      ICNREC = NSUP-NINF +1 ; ICØNT = 0
  821 IF(ICØNT.LT.ICNREC)IDLT=1 ; GØTØ870
      IDLT=0 ; GØTØ322
  870 READ(ITAPE,11)IREC1,ISØRC,KGDA,KGMØ,KGYR,KGHM,
     1  CLAT,CLØNG,ELEV,K977,ØBSG,IDEP,FA,BG,TC,IELC,IGC,
     2  RFA,IREGC,IFFC,IA,IFBC,LTKEY,LGKEY,IAKEY
      ICØNT = ICØNT+1
      GØTØ101
  343 WRITE(IIØUT,344)
  344 FØRMAT(1H0,'TEST AREA ALREADY PRØCESSED',/)
```

```
      KK=9 ; RETURN
  331 WRITE(IIOUT,345)
  345 FORMAT(1H0,'INCORRECT CLT TABLE - FOUND EOF WHILE PROCESSING
     * RECORDS')
      KK=9 ; RETURN
  333 WRITE(IIOUT,346)
  346 FORMAT(1H0,'INCORRECT CLT TABLE - FOUND END OF TAPE WHILE
     * SKIPPING RECORDS',/)
      KK=9; RETURN
  332 WRITE(IIOUT,347)
  347 FORMAT(1H0,'ERROR CONDITION WHILE SKIPPING RECORDS',/)
      KK=9 ; RETURN
       END                                                              CINS2060
```

```
                   HEX     DEC                        HEX     DEC                        HEX     DEC
NAME TYPE CLASS    LØC    WØRDS    NAME TYPE CLASS    LØC    WØRDS    NAME TYPE CLASS    LØC    WØRDS
---- ---- -----  -------- -----    ---- ---- -----  -------- -----    ---- ---- -----  -------- -----
ABG     R SCALR   003C9 V     1    ABS     R SPRØG   INTRIN           AFA     R SCALR   003C8 V     1
AHEIGT  R SCALR   003C5 V     1    ALMAX   R SCALR   003D6 V     1    ALMIN   R SCALR   003D5 V     1
AREAK     SPRØG   EXTERN           BG      R SCALR  *003F3 V DUMMY    CLAT    R SCALR   003C3 V     1
CLØNG   R SCALR   003C4 V     1    DEGRA   R SCALR   0039F V     1    DG      R SCALR   003C1 V     1
DLABØ   R SCALR   003AA V     1    DLACØ   R SCALR   003DB V     1    DLAT    R SCALR   003B9 V     1
DLATØ   R SCALR   003A9 V     1    DLAUP   R SCALR   003DA V     1    DLØDØ   R SCALR   003D9 V     1
DLØLE   R SCALR   003AB V     1    DLØNG   R SCALR   003BA V     1    DLØRI   R SCALR   003AC V     1
DLØUP   R SCALR   003C8 V     1    ELEV    R SCALR  *003EE V DUMMY    ENDIØ     SPRØG   EXTERN
ENDLT     SPRØG   EXTERN           EVIL      SPRØG   EXTERN           FA      R SCALR  *003F2 V DUMMY
FLØAT   R SPRØG   INTRIN           GINØT     SPRØG   00000 P          GINØT   R SCALR   00000 V     1
GØBS    R SCALR   003C0 V     1    I       I SCALR   003BE V     1    IA      I ARRAY  *003FA V DUMMY
IAFMT   I ARRAY   0035D V     9    IAKEY   I SCALR   003BD V     1    IASH    I ARRAY   00366 V    35
IBAC    I SCALR   003BF V     1    IBEG    I SCALR   003DC V     1    IBK     I ARRAY   00015 V    20
ICNREC  I SCALR   003E1 V     1    ICØNT   I SCALR   003E2 V     1    IDENS   I ARRAY   0003D V    20
IDEP    I SCALR  *003F1 V DUMMY    IDESC   I ARRAY   00051 V   340    IDIF      UNUSED*003EA V DUMMY
IDISC   I SCALR   0039E V     1    IDL     I SCALR   003A7 V     1    IDLT    I SCALR   003AE V     1
IDTIN   I ARRAY   00001 V    20    IDTØT   I ARRAY   001A5 V    20    IELC    I SCALR  *003F5 V DUMMY
IFBC    I SCALR  *003FB V DUMMY    IFFC    I SCALR  *003F9 V DUMMY    IFILE   I SCALR   003A2 V     1
IGC     I SCALR  *003F6 V DUMMY    IIN     I SCALR   0039B V     1    IIØUT   I SCALR   0039C V     1
ILAST   I SCALR   003D1 V     1    ILI     I SCALR   003A6 V     1    INDICA  I SCALR   003AD V     1
IPRE    I SCALR   003CE V     1    IPLN    I SCALR   0039D V     1    IRECIN  I SCALR   003B5 V     1
IREC1   I SCALR   003B3 V     1    IREC2   I SCALR   003B4 V     1    IREGC   I SCALR  *003F8 V DUMMY
ISL     I SPRØG   INTRIN           ISØRC   I SCALR  *003EB V DUMMY    ISRC    I ARRAY   00389 V    16
ISW     I SPRØG   EXTERN           ITAPE   I SCALR  *003E3 V DUMMY    ITERI   I SCALR   00399 V     1
ITERØ   I SCALR   0039A V     1    ITK     I ARRAY   00029 V    20    J       I SCALR   003A8 V     1
JBK     I ARRAY   001B9 V    20    JDENS   I ARRAY   001E1 V    20    JDESC   I ARRAY   001F5 V   340
JFILE   I SCALR   003B8 V     1    JK      I SCALR   003C2 V     1    JTAPE   I SCALR  *003E4 V DUMMY
JTK     I ARRAY   001CD V    20    K       I SCALR   003B6 V     1    KABG    I SCALR   003C7 V     1
KAFA    I SCALR   003C6 V     1    KGDA    I SCALR  *003E6 V DUMMY    KGDAØ   I SCALR   003AF V     1
KGHM    I SCALR  *003E9 V DUMMY    KGHMØ   I SCALR   003B2 V     1    KGMØ    I SCALR  *003E7 V DUMMY
KGMØØ   I SCALR   003B0 V     1    KGYR    I SCALR  *003E8 V DUMMY    KGYRØ   I SCALR   003B1 V     1
KK      I SCALR  *003E5 V DUMMY    K977    I SCALR  *003EF V DUMMY    LASTR   I SCALR   003D2 V     1
LGKEY   I SCALR   003BC V     1    LTKEY   I SCALR   003BB V     1    MAXCT   I SCALR   003A5 V     1
MØUNT     SPRØG   EXTERN           NBLØ    I SCALR   003D0 V     1    NEF     I SCALR   003A1 V     1
NENC    I SCALR   003B7 V     1    NFIR    I SCALR   003DD V     1    NINF    I SCALR   003DE V     1
NMAX    I SCALR   003CD V     1    NPRE    I SCALR   003CF V     1    NRECT   I SCALR   003A3 V     1
NSKIP   I SCALR   003E0 V     1    NSUP    I SCALR   003CF V     1    NUMØ    I SCALR   003CA V     1
NZERØ   I SCALR   003A4 V     1    ØBG       SPRØG   EXTERN           ØBSG    R SCALR  *003F0 V DUMMY
ØLARG   R SCALR   003D7 V     1    ØLMAX   R SCALR   003D3 V     1    ØLMIN   R SCALR   003D4 V     1
PKBY      SPRØG   EXTERN           PLAT    R SCALR   003CB V     1    PLØNG   R SCALR   003CC V     1
PLT     R ARRAY   00349 V    20    RADEG   R SCALR   003A0 V     1    RFA     R SCALR  *003F7 V DUMMY
RLAT    R SCALR  *003EC V DUMMY    RLØNG   R SCALR  *003ED V DUMMY    SETSKP    SPRØG   EXTERN
SIN     R SPRØG   INTRIN           SKPREC    SPRØG   EXTERN           STAT      SPRØG   EXTERN
TC      R SCALR  *003F4 V DUMMY


        HEX           HEX           HEX           HEX           HEX           HEX
LABEL   LØC   LABEL   LØC   LABEL   LØC   LABEL   LØC   LABEL   LØC   LABEL   LØC
-----  -----  -----  -----  -----  -----  -----  -----  -----  -----  -----  -----
   11  00382     50  001A5     52  001B1     53  00203     70  002B1     71  002B6
   72  002BE     73  002C3     85  0039B     90  003D4     91  003DA    100  001D3
  101  001F4    105  002F9    109  0032C    110  0039C    321  00438    322  0042D
  323  0045C    324  0046E    325  00475    326  00477    330  004A1    331  004E8
  332  0051F    333  005C2    343  004D6    344  004DA    345  004EC    346  00506
  347  00523    400  0002C    404  00089    405  000BB    406  000D6    407  00078
  408  000FB    409  000FD    410  001A5    418  0032C    420  00335    469  003BD
```

```
 5C0  CC41E       575  C0265       576  CC268       577  C02AE       600  00219       601  0021C
 610  CC229       611  C025B       612  CC25E       613  C0261       700  0041F       710  001F7
 72C  CC0F6       80C  002F1       801  CC2F4       802  C02FC       803  00311       810  0014C
 812  CC42B       82C  C0289       821  CC4AA       87C  C04B3       900  00083       902  00411
 912  CC0A3       913  C0098       990  CC3E7       995  C040C       999  0041E      1405  000AF
1410  CC13C      1412  00135      1413  CC165      1414  C017A      1416  0017F      1418  001A4
165C  CC2C5      170C  002CA      1710  CC2E2      1730  C02E6      2414  0017A

LOCAL VARIABLES (995 WORDS):

   C0C00 GINOT      000C1 ICTIN      00015 IBK        00029 ITK        0003D IDENS      00051 IDESC
   C01A5 ICTOT      CC1B9 JBK        001CC JTK        0C1E1 JDENS      001F5 JDESC      00349 PLT
   0035C IAFMT      00366 IASH       00389 ISRC       00399 ITERI      0039A ITERO      0039B IIN
   C039C IIOUT      0039C IPUN       0039E IDISC      0C39F DEGRA      003A0 RADEG      003A1 NEF
   C03A2 IFILE      003A3 NRECT      003A4 NZERO      003A5 MAXCY      003A6 ILI        003A7 IDL
   C03A8 J          003A9 DLATO      003AA DLABO      003AB DLOLE      003AC DLORI      003AD INDICA
   003AE ICLT       003AF KGDAO      003BC KGMOO      003B1 KGYRO      003B2 KGHMO      003B3 IREC1
   003B4 IREC2      003B5 IRECIN     C03B6 K          0C3B7 NEND       003B8 JFILE      003B9 DLAT
   C03BA CLONG      003BB LTKEY      003BC LGKEY      003BC IAKEY      003BE I          003BF IBAD
   003CC GOBS       0C3C1 CG         003C2 JK*        003C3 CLAT       003C4 CLONG      003C5 AHEIGT
   003C6 KAFA       003C7 KABG       003C8 AFA        0C3C9 ABG        003CA NUMO       003CB PLAT
   C03CC PLONG      003CC NMAX       003CE IPRE       003CF NPRE       003D0 NBLO       003D1 ILAST
   003D2 LASTR      003C3 OLMAX      003C4 OLMIN      003D5 ALMIN      003D6 ALMAX      003D7 OLARG
   003C8 CLOUP      C03C9 DLOCO      003CA DLAUP      003C8 DLADO      003DC IBEG       003DD NFIR
   C03CE NINF       003DF NSUP       003EC NSKIP      CC3E1 ICNREC     003E2 ICONT

BLANK COMMON (C WORDS)

ENTRY POINTS:

   C0C0C GINOT

INTRINSIC SUBPROGRAMS USED:

   ABS        FLOAT      ISL        SIN

EXTERNAL SUBPROGRAMS REGUIRED:

   AREAK      ENCIO      ENCLT      EVIL       IS*        MOUNT      OBG        PKBY
   SETSKP     SKPREC     STAT       F:101      F:102      F:103      F:104      F:105
   F:1C6      F:1C8      9BCDRDEE   9BCDREAD   9BCDWRIT   9DECODE    9ENDFILE   9ENDIOL
   9IODATA    9IOLUSA    9ITOR      9PRINT     9REWINC    9RTOI      9SETUPN    9SIN

HIGHEST ERROR SEVERITY: C (NO ERRORS)

                      DEC        HEX
                     WORDS      WORDS
                     -----      -----
   GENERATEC CODE:    1331      C0533
        CONSTANTS:      24      CC018
  LOCAL VARIABLES:     995      C03E3
            TEMPS:      27      C0C1B
                     -----      -----
    TOTAL PROGRAM:    2377      C0949
```

```
      FUNCTION GINTF(RLAT)
C
C     GINTF CALCULATES THEORETICAL GRAVITY FROM INTERNATIONAL
C     GRAVITY FORMULA 'EARTH AND ITS GRAVITY FIELD' HEISKANEN
C     AND VENING MEINESZ  1958  PAGE 74.    EXPANDED BY A.
C     FOLINSBEE USING FORMULA  (SIN(X))**2= (1-COS(2X))/2
C
C     VALUE RETURNS A G - 977000 MGALS
C
      A = ABS(RLAT)
      GINTF = 3632.272-2586.157*COS(2.*A)+2.885*COS(4.*A)
      RETURN
      END
```

```
                        HEX     DEC                                 HEX     DEC                                 HEX     DEC
NAME   TYPE  CLASS      LØC     WØRDS       NAME   TYPE  CLASS      LØC     WØRDS       NAME   TYPE  CLASS      LØC     WØRDS
----   ----  -----    -------   -----       ----   ----  -----    -------   -----       ----   ----  -----    -------   -----
A         R  SCALR    00001 V       1       ABS       R  SPRØG    INTRIN                CØS       R  SPRØG    INTRIN
GINTF     R  SCALR    00000 V       1       GINTF     R  SPRØG    00000 P               RLAT      R  SCALR   *00002 V DUMMY

LØCAL VARIABLES (2 WØRDS):

   00000 GINTF      00001 A

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GINTF

INTRINSIC SUBPRØGRAMS USED:

   ABS        CØS

EXTERNAL SUBPRØGRAMS REQUIRED:

   9CØS       9SETUP1

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                   DEC       HEX
                  WØRDS     WØRDS
                  -----     -----
 GENERATED CØDE:     20     00014
      CØNSTANTS:      5     00005
LØCAL VARIABLES:      2     00002
          TEMPS:      3     00003
                  -----     -----
  TØTAL PRØGRAM:     30     0001E
```

```
      FUNCTIØN GI67F(RLAT)
C     VERSIØN ØF 25 APR 75 TØ REDUCE FØRMALLA BY USING
C     EXPRESSIØN SIN(X)**2 = (1-CØS(2X))/2
C     CALCULATES THEØRETICAL GRAVITY FRØM THE INTERNATIØNAL FØRMULA
C     ACCØRDING TØ RESØLUTIØN NØ. 2 ØF THE XIV TH GENERAL ASSEMBLY ØF
C      THE I.U.G.G. 1967
C     FØR DETAILS ØF THE FØRMULA SEE PAGE 74 ØF
C     GEØDETIC REFERENENCE SYSTEM 1967
C
C     VALUE RETURNED AS G-977000 MGALS
C
      A=ABS(RLAT)
      GI67F = 3621.9455 - 2592.5639*CØS(2.*A) + 2.8683*CØS(4.*A)
      RETURN
      END
```

```
                           HEX     DEC                                 HEX     DEC                                 HEX     DEC
NAME   TYPE CLASS          LØC     WØRDS     NAME   TYPE CLASS         LØC     WØRDS     NAME   TYPE CLASS         LØC     WØRDS
----   ---- -----        -------   -----     ----   ---- -----       -------   -----     ----   ---- -----       -------   -----
A         R SCALR        00001 V       1     ABS       R SPRØG       INTRIN              CØS       R SPRØG       INTRIN
GI67F     R SCALR        00000 V       1     GI67F     R SPRØG       00000 P             RLAT      R SCALR      *00002 V DUMMY

LØCAL VARIABLES (2 WØRDS):

   00000 GI67F      00001 A

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GI67F

INTRINSIC SUBPRØGRAMS USED:

   ABS        CØS

EXTERNAL SUBPRØGRAMS REQUIRED:

   9CØS       9SETUP1

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                         DEC        HEX
                        WØRDS      WØRDS
                        -----      -----
   GENERATED CØDE:         20      00014
        CØNSTANTS:          5      00005
  LØCAL VARIABLES:          2      00002
            TEMPS:          3      00003
                        -----      -----
    TØTAL PRØGRAM:         30      0001E
```

```
      SLBRθLTINE GRIDG(ZZ,HGT,XFAC,YFAC,TθP,BθT,DLEFT,RIGT)
C  SLBRθLTINE GRIDG, FθR GRAF3
C  ANθTATES X AND Y SCALES
C
C  SSW(8) = LP Tθ SUPPRESS ANθTATIθN θF X AND Y SCALES
C
C     LSES SLBRθLTINES FθR CALCθMP AND ISW
C     ASSLME ISW INITIIALIZED IN MAIN PRθGRAM
C
C
CS    IIθLT=2
      IIθLT = 108
CS    WRITE(IIθLT,10)
CS 10 FθRMAT('SET PEN Tθ θRIGIN θF PLθT IN BθTH X AND Y')
CS    PAUSE 10
CS    CALL WHERE(XθRG,YθRG)
      CALL WHERE (XθRG, YθRG, RFACT)
      CALL PLθT(XθRG,YθRG,-3)
CS    CALL SYMB(0.0,0.0,0.14,3,0.0,-1)
      CALL SYMBθL (0.0, 0.0, 0.14, 3, 0.0, -1)
      IF(ISW(8))300,20,300
C  PLθTTING X AND Y SCALES EVERY INCH
   20 ANGC=0.0
      JDEC=-1
      ANGD=0.0
      KDEC=-1
      TθPY=TθP/YFAC
      BθTY=BθT/YFAC
      DLEFX=DLEFT/XFAC
      RIGTX=RIGT/XFAC
      AK=0.2*ZZ
      A3=0.3*ZZ
      XX=DLEFX
      YY=BθTY
      ANT=DLEFT
      CALL PLθT(XX,YY,3)
C  PLθTTING TIC
   50 YT=YY+A3
      CALL PLθT(XX,YT,2)
      XT=XX-AK
      YT=YY-AK
CS    CALL NLMB(XT,YT,HGT,ANT,ANGC,JDEC)
      CALL NLMBER (XT, YT, HGT, ANT, ANGC, JDEC)
      CALL PLθT(XX,YY,3)
      IF(XX-RIGTX)100,200,200
  100 XX=XX+(1.0*ZZ)
      CALL PLθT(XX,YY,2)
      ANT=ANT+(XFAC*ZZ)
      Gθ Tθ 50
C  PLθTTING BθRDER θF GRID LIMITS
  200 XX=RIGTX
      YY=BθTY
      CALL PLθT(XX,YY,3)
      YY=TθPY
      CALL PLθT(XX,YY,2)
      XX=DLEFX
      CALL PLθT(XX,YY,2)
      ANT=TθP
      AX=-(0.5*ZZ)
      AY=-(0.03*ZZ)
C  PLØTTING TIC
  220 XT=XX+A3
      CALL PLØT(XT,YY,2)
      XT=XX+AX
      YT=YY+AY
CS    CALL NUMB(XT,YT,HGT,ANT,ANGD,KDEC)
      CALL NUMBER (XT, YT, HGT, ANT, ANGD, KDEC)
      CALL PLØT(XX,YY,3)
      IF(YY-BØTY)300,300,250
  250 YY=YY-(1.0*ZZ)
      CALL PLØT(XX,YY,2)
      ANT=ANT-(YFAC*ZZ)
      GØ TØ 220
  300 RETURN
      END
```

```
                       HEX     DEC                             HEX     DEC                             HEX     DEC
NAME    TYPE CLASS     LOC     WORDS     NAME    TYPE CLASS     LOC     WORDS     NAME    TYPE CLASS     LOC     WORDS
----    ---- -----   -------   -----     ----    ---- -----   -------   -----     ----    ---- -----   -------   -----
AK         R SCALR    0000D V      1     ANGC       R SCALR    00005 V      1     ANGD       R SCALR    00007 V      1
ANT        R SCALR    00011 V      1     AX         R SCALR    00014 V      1     AY         R SCALR    00015 V      1
A3         R SCALR    0000E V      1     BOT        R SCALR   *00018 V DUMMY     BOTY       R SCALR    0000A V      1
CLEFT      R SCALR   *0001C V DUMMY     DLEFX      R SCALR    0000B V      1     GRIDG      R SCALR    00000 V      1
GRIDG        SPROG    0000C F           HGT        R SCALR   *00017 V DUMMY     IIOUT      I SCALR    00001 V      1
ISW        I SPROG    EXTERN            JDEC       I SCALR    00006 V      1     KDEC       I SCALR    00008 V      1
NUMBER       SPROG    EXTERN            PLOT         SPROG    EXTERN            RFACT      R SCALR    00004 V      1
RIGT       R SCALR   *0001D V DUMMY     RIGTX      R SCALR    0000C V      1     SYMBOL       SPROG    EXTERN
TOP        R SCALR   *0001A V DUMMY     TOPY       R SCALR    00009 V      1     WHERE        SPROG    EXTERN
XFAC       R SCALR   *0001B V DUMMY     XORG       R SCALR    00002 V      1     XT         R SCALR    00013 V      1
XX         R SCALR    0000F V      1     YFAC       R SCALR   *00019 V DUMMY     YORG       R SCALR    00003 V      1
YT         R SCALR    00012 V      1     YY         R SCALR    00010 V      1     ZZ         R SCALR   *00016 V DUMMY

         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC      LABEL    LOC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
   20   00024        50   00049       100   00067       200   00075       220   00096       250   000B4
  300   000C4

LOCAL VARIABLES (22 WORDS):

   00000 GRIDG       00001 IIOUT       00002 XORG        00003 YORG        00004 RFACT       00005 ANGC
   00006 JDEC        00007 ANGD        00008 KDEC        00009 TOPY        0000A BOTY        0000B DLEFX
   0000C RIGTX       0000D AK          0000E A3          0000F XX          00010 YY          00011 ANT
   00012 YT          00013 XT          00014 AX          00015 AY

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   0000C GRIDG

EXTERNAL SUBPROGRAMS REQUIRED:

   ISW         NUMBER      PLOT        SYMBOL      WHERE       SSETUPN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                      DEC       HEX
                     WORDS     WORDS
                     -----     -----
  GENERATED CODE:      197     000C5
       CONSTANTS:       12     0000C
 LOCAL VARIABLES:       22     00016
           TEMPS:        9     00009
                     -----     -----
  TOTAL PROGRAM:       240     000F0
```

```
      SUBROUTINE GRID2(ZZ,ZHT,NUMPL,DEGRA,FDEG2,RDEG2,RTOP,ITOP,RBOT,
     1 IBOT,RLEFT,ILEFT,RRIGT,IRIGT,SINCH,SMP,FBOT,FTOP,FLEFT,FRIGT,
     2 NDEG,SLAT,SLONG,BOTMP)
C
C PLOTS AND ANNOTATES MERCATOR CHART GRID
C  20 OCTOBER 1972
C
C
C  SSW(1) UP TO DRAW PERIMETER OF GRID ONLY
C  SSW(5) =0 TO MAKE DEGREE ANNOTATIONS INSIDE GRID (CHARACTER SIZE 0.07 INCH)
C         =1 TO MAKE DEGREE ANNOTATIONS OUTSIDE GRID (CHARACTER SIZE 0.21 INCH)
C         =2 TO MAKE DEGREE ANNOTATIONS OUTSIDE GRID (CHARACTER SIZE 0.35 INCH)
C  SSW(8) UP TO SUPPRESS PLOTTING OF GRID
C
C       USES SUBROUTINES WHR, ISW, AND CALCOMP ROUTINES
C       ASSUMES ISW INITIALIZED IN MAIN PROGRAM
C
C        INITIALIZING DISTANCE AND CHARACTER HEIGHT CONSTANTS
   10   SA=0.02*ZZ
        SB=0.05*ZZ
        SC=0.15*ZZ
        SD=0.22*ZZ
        SE=0.18*ZZ
        SF=-0.25*ZZ
        SG=0.26*ZZ
      IF(ISW(5).EQ.0) ZFAC=1.; GO TO 18
      IF(ISW(5).EQ.1) ZFAC=3.
      IF(ISW(5).EQ.2) ZFAC=5.
        TA=-(0.05+(ZFAC*0.05))*ZZ
        TB=-(0.07+(ZFAC*0.07))*ZZ
        TC=(ZFAC*0.24)*ZZ
        TD=0.04*ZZ
   18 HGT=ZFAC*0.07*ZHT
C  SET ORIGIN FOR CHART
      CALL WHERE(XX,YY,RFACT)
        CALL PLOT(XX,YY,-3)
        IF(ISW(8))80,20,80
C  ANNOTATING PLOT NUMBER IN LOWER LEFT HAND CORNER
   20   IF(ISW(5))121,21,121
  121   SF=-((ZFAC+1.0)*0.24)*ZZ
   21   CALL SYMBOL(SF,SA,HGT,NUMPL,90.,4)
C   ANNOTATING GRID
        IF(ISW(5))24,24,22
 22     CALL NUMBER (TA, TB, HGT, FLEFT, 0.0, -1)
        GO TO 26
 24     CALL NUMBER (SB, SA, HGT, FLEFT, 0.0, -1)
   26   CALL PLOT(0.0,0.0,3)
C  START PLOTTING GRID
        SLAT=RBOT
        SLONG=RRIGT
      CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLONG,BOTMP,XX,YY)
        CALL PLOT (XX,YY,2)
        IF(ISW(5))30,30,28
   28   XT=XX+TA
        YT=YY+TB
        GO TO 32
   30   XT=XX-SG
        YT=YY+SB
 32     CALL NUMBER (XT, YT, HGT, FRIGT, 0.0, -1)
```

```
        IF(ISW(5)) 71,71,72
     72 XT=XX-TA
        YT=-TD
        GØ TØ 73
     71 YT=SC
     73 CALL NUMBER(XT,YT,HGT,FBØT,0.0,-1)
C. DRAW LEFT AND TØP SIDES ØF FIDUCIAL HALF-INCH SQUARE
        XFID=XX+1.0
        YFID=YY-0.5
        CALL PLØT(XFID,YFID,3)
        YFID=YFID+0.5
        CALL PLØT(XFID,YFID,2)
        XFID=XFID+0.5
        CALL PLØT(XFID,YFID,2)
          CALL PLØT(XX,YY,3)
         SLAT=RTØP
        CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
         CALL PLØT (XX,YY,2)
        IF(ISW(5)) 75,75,76
     76 YT=YY-TC
        GØ TØ 77
     75 YT=YY-SE
     77 CALL NUMBER(XT,YT,HGT,FTØP,0.0,-1)
        CALL PLØT(XX,YY,3)
         SLØNG=RLEFT
        CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
         CALL PLØT(XX,YY,2)
         IF(ISW(5))36,36,34
     34 XT=-TC
         YT=YY-TD
         GØ TØ 38
     36  XT=XX+SC
   38    CALL NUMBER (XT, YT, HGT, FTØP, 0.0, -1)
         CALL PLØT (XX,YY,3)
         CALL PLØT(0.0,0.0,2)
         IF(ISW(5))42,42,40
     40  XT=-TC
         YT=-TC
         GØ TØ 44
     42  XT=SC
         YT=SD
   44    CALL NUMBER (XT, YT, HGT, FBØT, 0.0, -1)
C  FINISHED DRAWING AND ANNOTATING PERIMETER ØF GRID
C  CHECKING IF NDEG GRID LINES WANTED
         IF(ISW(1)) 80,50,80
     50  NND=((IRIGT-ILEFT)/NDEG)*NDEG
         NBØT=1
         DØ 60 N=NDEG,NND,NDEG
         JK=IRIGT-(ILEFT+N)
         IF(JK)51,61,51
     51  AAA=N
         RMØRE=DEGRA*AAA
         SLØNG=RLEFT+RMØRE
        FLØNG=SLØNG*57.29578
         IF(NBØT-1)54,52,54
     52  SLAT=RBØT
        CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
         CALL PLØT(XX,YY,3)
         IF(ISW(5))55,55,53
     53  XT=XX+TA
```

```
           YT=YY+TB
           GØ TØ 56
      55   XT=XX+SB
           YT=YY+SA
     56    CALL NUMBER (XT, YT, HGT, FLØNG, 0.0, -1)
           CALL PLØT(XX,YY,3)
           SLAT=RTØP
          CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY
           CALL PLØT(XX,YY,2)
           NBØT=2
           GØ TØ 60
      54   SLAT=RTØP
          CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
           CALL PLØT(XX,YY,3)
           SLAT=RBØT
          CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
           CALL PLØT(XX,YY,2)
           IF(ISW(5))58,58,57
      57   XT=XX+TA
           YT=YY+TB
           GØ TØ 59
      58    XT=XX+SB
            YT=YY+SA
     59    CALL NUMBER (XT, YT, HGT, FLØNG, 0.C, -1)
            CALL PLØT(XX,YY,3)
           NBØT=1
  C   FINISHED DRAWING AND ANNØTATING THIS LØNGITUDE LINE
      60   CØNTINUE
  C   CØMPLETED ALL LØNGITUDE GRID LINES
      61   NND=((ITØP-IBØT)/NDEG)*NDEG
           NLEFT=2
           DØ 70 N=NDEG,NND,NDEG
           JK= ITØP-(IBØT+N)
           IF(JK)161,80,161
     161   AAA=N
           RMØRE=DEGRA*AAA
           SLAT=RBØT+RMØRE
          FLAT=SLAT*57.29578
           IF(NLEFT-1)64,62,64
      62   SLØNG=RLEFT
          CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
           CALL PLØT(XX,YY,3)
           IF(ISW(5))65,65,63
      63   XT=X -TC
           YT=YY-TD
           GØ TØ 66
      65   XT=XX+SC
           YT=YY+SB
     66    CALL NUMBER (XT, YT, HGT, FLAT, 0.0, -1)
           CALL PLØT(XX,YY,3)
           SLØNG=RRIGT
          CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
           CALL PLØT(XX,YY,2)
           NLEFT=2
           GØ TØ 70
      64   SLØNG=RRIGT
          CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
           CALL PLØT(XX,YY,3)
           SLØNG=RLEFT
          CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMP,SLAT,SLØNG,BØTMP,XX,YY)
```

```
            CALL PLØT(XX,YY,2)
            IF(ISW(5))68,68,67
        67  XT=XX-TC
            YT=YY-TD
            GØ TØ 69
        68  XT=XX+SC
            YT=YY+SB
     69     CALL NUMBER (XT, YT, HGT, FLAT, 0.0, -1)
            CALL PLØT(XX,YY,3)
            NLEFT=1
     C  FINISHED ANNØTATING AND DRAWING THIS LATITUDE LINE
        70  CØNTINUE
     C  CØMPLETED ALL GRID LINES AND ANNØTATIONS
        80 RETURN
            END
```

```
                     HEX      DEC                                  HEX      DEC                                  HEX      DEC
NAME   TYPE CLASS    LØC      WØRDS     NAME   TYPE CLASS          LØC      WØRDS     NAME   TYPE CLASS          LØC      WØRDS
----   ---- -----  -------    -----     ----   ---- -----        -------    -----     ----   ---- -----        -------    -----
AAA       R SCALR   00019 V       1     BØTMP     R SCALR *00036 V DUMMY    DEGRA     R SCALR *00022 V DUMMY
FBØT      R SCALR  *0002F V  DUMMY      FDEG2     R SCALR *00023 V DUMMY    FLAT      R SCALR  0001D V      1
FLEFT     R SCALR  *00031 V  DUMMY      FLØNG     R SCALR  0001B V     1    FRIGT     R SCALR *00032 V DUMMY
FTØP      R SCALR  *0003C V  DUMMY      GRID2       SPRØG  00000 P          GRID2     R SCALR  00000 V      1
HGT       R SCALR   0000D V       1     IBØT      I SCALR *00028 V DUMMY    ILEFT     I SCALR *0002A V DUMMY
IRIGT     I SCALR  *0002C V  DUMMY      ISW       I SPRØG  EXTERN           ITØP      I SCALR *00026 V DUMMY
JK        I SCALR   00018 V       1     N         I SCALR  00017 V     1    NBØT      I SCALR  00016 V      1
NDEG      I SCALR  *00033 V  DUMMY      NLEFT     I SCALR  0001C V     1    NND       I SCALR  00015 V      1
NUMBER      SPRØG   EXTERN              NUMPL     I SCALR *00021 V DUMMY    PLØT        SPRØG  EXTERN
RBØT      R SCALR  *00027 V  DUMMY      RDEG2     R SCALR *00024 V DUMMY    RFACT     R SCALR  00010 V      1
RLEFT     R SCALR  *00029 V  DUMMY      RMØRE     R SCALR  0001A V     1    RRIGT     R SCALR *0002B V DUMMY
RTØP      R SCALR  *00025 V  DUMMY      SA        R SCALR  00001 V     1    SB        R SCALR  00002 V      1
SC        R SCALR   00003 V       1     SD        R SCALR  00004 V     1    SE        R SCALR  00005 V      1
SF        R SCALR   00006 V       1     SG        R SCALR  00007 V     1    SINCH     R SCALR *0002D V DUMMY
SLAT      R SCALR  *00034 V  DUMMY      SLØNG     R SCALR *00035 V DUMMY    SMP       R SCALR *0002E V DUMMY
SYMBØL      SPRØG   EXTERN              TA        R SCALR  00009 V     1    TB        R SCALR  0000A V      1
TC        R SCALR   0000B V       1     TD        R SCALR  0000C V     1    WHERE       SPRØG  EXTERN
WHR         SPRØG   EXTERN              X         R SCALR  0001E V     1    XFID      R SCALR  00013 V      1
XT        R SCALR   00011 V       1     XX        R SCALR  0000E V     1    YFID      R SCALR  00014 V      1
YT        R SCALR   00012 V       1     YY        R SCALR  0000F V     1    ZFAC      R SCALR  00008 V      1
ZHT       R SCALR  *00020 V  DUMMY      ZZ        R SCALR *0001F V DUMMY

        HEX             HEX             HEX             HEX             HEX             HEX
LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC
-----  -----    -----  -----    -----  -----    -----  -----    -----  -----    -----  -----
   10  0001B       18  0005A       20  0006D       21  00078       22  00085       24  0008E
   26  00096       28  00086       30  000BD       32  000C3       34  00147       36  0014E
   38  00151       40  00168       42  0016F       44  00173       50  00180       51  00193
   52  001A2       53  001BB       54  001EC       55  001C2       56  001C8       57  00219
   58  0022C       59  00226       60  00235       61  00239       62  0025B       63  00274
   64  002A5       65  0027B       66  00281       67  002D2       68  002D9       69  002DF
   70  002EE       71  000C7       72  000D0       73  000D9       75  0011E       76  0011A
   77  00121       80  002F2      121  00072      161  0024C

LØCAL VARIABLES (31 WØRDS):

   00000 GRID2     00001 SA      00002 SB      00003 SC      00004 SD      00005 SE
   00006 SF        00007 SG      00008 ZFAC    00009 TA      0000A TB      0000B TC
   0000C TD        0000D HGT     0000E XX      0000F YY      00010 RFACT   00011 XT
   00012 YT        00013 XFID    00014 YFIC    00015 NND     00016 NBØT    00017 N
   00018 JK        00019 AAA     0001A RMØRE   0001B FLØNG   0001C NLEFT   0001D FLAT
   0001E X

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 GRID2

EXTERNAL SUBPRØGRAMS REQUIRED:

   ISW       NUMBER    PLØT      SYMBØL    WHERE     WHR       9ITCR
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                       DEC        HEX
                      WØRDS      WØRDS
                      -----      -----
   GENERATED CØDE:      755      002F3
        CØNSTANTS:       26      0001A
  LØCAL VARIABLES:       31      0001F
            TEMPS:       27      0001B
                      -----      -----
    TØTAL PRØGRAM:      839      00347
```

```
      SUBRØUTINE INCEP(SL,SW,CX,CY,CXP,CYP,BX,BY,A1,A2,B1,B2)
C
C  SUBRØUTINE INCEP, DETERMINES INTERCEPT PØINTS ØF LINE BETWEEN
C  ANY 2 PØINTS AND GIVEN BØUNDARIES
C
C     USES SUBRØUTINE EXTD
C
      N=0
      SM=(CY-CYP)/(CX-CXP)
      B=((CYP*CX)-(CY*CXP))/(CX-CXP)
  200 IF((ABS(CXP))-SL)205,205,300
  205 IF((ABS(CYP))-SW)206,206,300
  206 A1=CXP
      B1=CYP
      N=N+1
  210 IF((ABS(CX))-SL)215,215,500
  215 IF((ABS(CY))-SW)220,220,500
  220 A2=CX
      B2=CY
      N=N+1
      IF(N-2)800,700,800
  300 BX=SL
      BY=SM*BX+B
  305 IF((ABS(BY))-SW)310,310,330
  310 CALL EXTD(CX,CXP,CY,CYP,BX,BY,IND)
      IF(IND)330,320,330
  320 A1=BX
      B1=BY
      N=N+1
  330 BY=SW
      BX=(BY-B)/SM
  335 IF((ABS(BX))-SL)340,340,365
  340 CALL EXTD(CX,CXP,CY,CYP,BX,BY,IND)
      IF(IND)365,350,365
  350 N=N+1
      IF(N-2)360,355,800
  355 A2=BX
      B2=BY
      GØ TØ 700
  360 A1=BX
      B1=BY
  365 BX=-SL
      BY= SM*BX+B
  370 IF((ABS(BY))-SW)375,375,390
  375 CALL EXTD(CX,CXP,CY,CYP,BX,BY,IND)
      IF(IND)390,385,390
  385 N=N+1
      IF(N-2)386,387,800
  386 A1=BX
      B1=BY
      GØ TØ 390
  387 A2=-SL
      A2=-SL
      B2=BY
      GØ TØ 700
  390 BY=-SW
      BX= (BY-B)/SM
  395 IF((ABS(BX))-SL)405,405,400
  405 CALL EXTD(CX,CXP,CY,CYP,BX,BY,IND)
```

```
      IF(IND)400,410,400
  400 IF(N-1)900,420,800
  420 A2=CX
      B2=CY
      GØ TØ 700
  410 N=N+1
      IF(N-2)411,412,800
  411 A1=BX
      B1=BY
      A2=CX
      B2=CY
      GØ TØ 700
  412 A2=BX
      B2=BY
      IF(N-2)800,700,800
  500 BX=SL
      BY=SM*BX+B
  505 IF((ABS(BY))-SW)515,515,525
  515 CALL EXTD(CX,CXP,CY,CYP,BX,BY,IND)
      IF(IND)525,520,525
  520 N=N+1
      A2=BX
      B2=BY
      IF(N-2)800,700,800
  525 BY=SW
      BX=(BY-B)/SM
  530 IF((ABS(BX))-SL)545,545,555
  545 CALL EXTD(CX,CXP,CY,CYP,BX,BY,IND)
      IF(IND)555,550,555
  550 N=N+1
      A2=BX
      B2=BY
      IF(N-2)800,700,800
  555 BX=-SL
      BY=SM*BX+B
  560 IF((ABS(BY))-SW)580,580,590
  580 CALL EXTD(CX,CXP,CY,CYP,BX,BY,IND)
      IF(IND)590,585,590
  585 N=N+1
      A2=BX
      B2=BY
      IF(N-2)800,700,800
  590 BY=-SW
      BX=(BY-B)/SM
  595 IF((ABS(BX))-SL)600,600,800
  600 N=N+1
      A2=BX
      B2=BY
      IF(N-2)800,700,800
  700 RETURN
  800 WRITE (108,802)
  802 FØRMAT ('INCEP:  BAD BRANCH')
  900 A1 = 9999.0
      A2 = 9999.0
      B1 = 9999.0
      B2 = 9999.0
      RETURN
      END
```

```
                      HEX    DEC                               HEX    DEC                               HEX    DEC
NAME  TYPE CLASS      LOC    WORDS      NAME  TYPE CLASS      LOC    WORDS      NAME  TYPE CLASS      LOC    WORDS
----  ---- -----   -------   -----      ----  ---- -----   -------   -----      ----  ---- -----   -------   -----
ABS      R SPROG    INTRIN              A1       R SCALR  *0000D V DUMMY        A2       R SCALR  *0000E V DUMMY
B        R SCALR    00003 V      1      BX       R SCALR  *0000B V DUMMY        BY       R SCALR  *0000C V DUMMY
B1       R SCALR  *0000F V  DUMMY       B2       R SCALR  *00010 V DUMMY        CX       R SCALR  *00007 V DUMMY
CXP      R SCALR  *00009 V  DUMMY       CY       R SCALR  *00008 V DUMMY        CYP      R SCALR  *0000A V DUMMY
EXTC       SPROG    EXTERN              INCEP    I SCALR   00000 V     1        INCEP      SPROG   00000 P
IND      I SCALR    00004 V      1      N        I SCALR   00001 V     1        SL       R SCALR  *00005 V DUMMY
SM       R SCALR    00002 V      1      SW       R SCALR  *00006 V DUMMY

        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LOC       LABEL   LOC       LABEL   LOC       LABEL   LOC       LABEL   LOC       LABEL   LOC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
  200   00023       205   00026       206   00029       210   0002E       215   00031       220   00034
  300   0003D       305   00043       310   00046       320   00051       330   00056       335   0005C
  340   0005F       350   0006A       355   0006F       360   00074       365   00078       370   0007F
  375   00082       385   0008D       386   00092       387   00097       390   000A0       395   000A7
  400   00085       405   000AA       410   000BE       411   000C3       412   000CC       420   000B9
  500   000D4       505   000CA       515   000DD       520   000E8       525   000F1       530   000F7
  545   000FA       550   00105       555   0010E       560   00115       580   00118       585   00123
  590   0012C       595   00133       600   00136       700   0013E       800   0013F       802   00142
  900   00149

LOCAL VARIABLES (5 WORDS):

   0000C INCEP      00001 N        00002 SM       00003 B        00004 IND

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 INCEP

INTRINSIC SUBPROGRAMS USED:

   ABS

EXTERNAL SUBPROGRAMS REQUIRED:

   EXTD      F:IO8     9ENDIOL    9PRINT    9SETUPN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                    DEC      HEX
                   WORDS    WORDS
                   -----    -----
  GENERATED CODE:   338     00152
       CONSTANTS:     1     00001
 LOCAL VARIABLES:     5     00005
           TEMPS:    15     0000F
                   -----    -----
   TOTAL PROGRAM:   359     00167
```

```
      FUNCTION ISW(I)
C        VERSION OF 27 JULY 1973, OUTPUT SSW CHANGE IF MADE
C        VERSION OF 25 JULY 1973, TO ADD ENTRY ICHG
C THIS FUNCTION READS A CARD WHEN I<0, SETTING VALUES OF ISW(I) IN COLUMNS 1 TO
C     79.  THE VALUE OF ISW(0) IS SET EQUAL TO ISW(80).  WITH THIS EXCEPTION
C  .  THE VALUE OF ISW(I) CORRESPONDS TO THE COLUMN NUMBER.
C FOR I.GE.0      RETURNS THE VALUE OF JSW(I)
      DIMENSION     JSW(0:80)
      IIN=105
      IIOUT=108
      IF (I.LT.0) GO TO 50
      ISW=JSW(I)
      RETURN
C
C  ENTRY POINT TO ALLOW CHANGING OF SSW VALUE
C
      ENTRY ICHG(I,IVAL)
      JSW(I)=IVAL
      WRITE(IIOUT,42)I,IVAL
   42 FORMAT(' SENSE SWITCH ',I4,' SET = TO ',I2)
      RETURN
   50 READ(IIN,60)(JSW(K), K=1,80)
60    FORMAT(80I1)
      JSW(0)=JSW(80)
      OUTPUT '  ISW FUNCTION, VERSION OF 27 JULY 73'
      WRITE(IIOUT,70)(JSW(K), K=0,  79)
   70 FORMAT('SENSE SWITCH OPTIONS (ISW): ',8(10I1,1X),4X,'(0-79)')
      RETURN
      END
```

```
                   HEX    DEC                            HEX    DEC                          HEX    DEC
NAME TYPE CLASS    LØC    WØRDS      NAME TYPE CLASS     LØC    WØRDS    NAME TYPE CLASS     LØC    WØRDS
---- ---- -----  -------  -----      ---- ---- -----   ------- -----    ---- ---- -----   -------  -----
I       I SCALR *00055 V DUMMY       ICHG    I SPRØG   0000F P          IIN     I SCALR  00052 V     1
IIØUT   I SCALR  00053 V     1       ISW     I SPRØG   00000 P          ISW     I SCALR  00000 V     1
IVAL    I SCALR *00056 V DUMMY       JSW     I ARRAY   00001 V    81    K       I SCALR  00054 V     1

        HEX           HEX           HEX           HEX           HEX           HEX
LABEL   LØC    LABEL  LØC    LABEL  LØC    LABEL  LØC    LABEL  LØC    LABEL  LØC
-----  -----   -----  -----  -----  -----  -----  -----  -----  -----  -----  -----
   42  0001C      50  00029     60  00036     70  00057

LØCAL VARIABLES (85 WØRDS):

  00000 ISW        00001 JSW        00052 IIN        00053 IIØUT      00054 K

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

  00000 ISW        0000F ICHG

EXTERNAL SUBPRØGRAMS REQUIRED:

  F:101      F:102      F:103      F:104      F:105      F:106      F:108      9BCDREAD
  9BCDWRIT   9ENDIØL    9IØDATA    9PRINT     9SETUP1    9SETUP2

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                   DEC.    HEX
                   WØRDS   WØRDS
                   -----   -----
 GENERATED CØDE:    104    00068
      CØNSTANTS:      0    00000
LØCAL VARIABLES:     85    00055
          TEMPS:      3    00003
                   -----   -----
  TØTAL PRØGRAM:    192    000C0
```

```
      SUBRØUTINE M2DY(IY,MØ,IDAY,IØ)
C***    M2DY CHANGES MØN,DAY TØ THE NUMBER ØF DAYSFØR THAT YEAR
C
C***  IY=YEAR (CØNVERTS FØR LEAP YEAR
C***  MØ=MØNTH
C***  IDAY=DAY
C***  IØ=ØUTPUT WHICH IS THE PRØGRESSIVE DAY NUMBER
C
      DIMENSIØN  MYDAY(12)
      DATA MYDAY/1,32,60,91,121,152,182,213,244,274,305,335/
C***  DETERMINE IF LEAP YEAR
      A=IY
      B=IY/4
      A=A/4.0
      IF (A-B) 12,10,12
   10 LEAP=1
      GØ TØ 13
   12 LEAP= 0
   13 CØNTINUE
      IF(MØ-2) 20,21,22
   21 IF(IDAY-28) 20,20,22
   20 LEAP=0
   22 IØ=IDAY+MYDAY(MØ)-1+LEAP
      RETURN
      END
```

```
                          HEX      DEC                               HEX      DEC                               HEX      DEC
NAME  TYPE CLASS          LØC      WØRDS     NAME   TYPE CLASS       LØC      WØRDS     NAME   TYPE CLASS       LØC      WØRDS
----  ---- -----        -------    -----     ----   ---- -----     -------    -----     ----   ---- -----     -------    -----
A        R SCALR        0000D V        1     B         R SCALR     0000E V        1     ID        I SCALR    *00013 V  DUMMY
IDAY     I SCALR       *00012 V    DUMMY     IY        I SCALR    *00010 V    DUMMY     LEAP      I SCALR     0000F V      1
MØ       I SCALR       *00011 V    DUMMY     MYDAY     I ARRAY     00001 V       12     M2DY        SPRØG     00000 P
M2DY     I SCALR        00000 V        1

        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
   10   00014        12   00017        13   00019        20   00020        21   0001D        22   00022

LØCAL VARIABLES (16 WØRDS):

   00000 M2DY        00001 MYDAY       0000D A           0000E B           0000F LEAP

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 M2DY

EXTERNAL SUBPRØGRAMS REQUIRED:

   9ITØR      SSETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC      HEX
                    WØRDS    WØRDS
                    -----    -----
 GENERATED CØDE:       41    00029
      CØNSTANTS:        2    00002
LØCAL VARIABLES:       16    0001C
          TEMPS:        5    00005
                    -----    -----
  TØTAL PRØGRAM:       64    0004C
```

```
      SUBRØUTINE NAVIN(LAT,RLATM,KNS,LØNG,RLØM,KEW,RLAT,RLØNG)
C
C  SUBRØUTINE NAVIN,  CØNVERTS ANØTATED DEGREES AND MINUTES
C                         TØ SIGNED RADIANS LATITUDE AND
C                         LØNGITUDE
C
C      USES SUBRØUTINE DMTØR
C
C
C
      NNS = 1HS
      NEW = 1HW
CS    NNS=123B
CS    NEW=127B
   60 RLAT=DMTØR(LAT,RLATM)
      RLØNG=DMTØR(LØNG,RLØM)
      IF(KNS-NNS)75,70,75
C  SØUTH LATITUDE
   70  RLAT=-RLAT
   75 IF(KEW-NEW)85,80,85
C  WEST LØNGITUDE
   80 RLØNG=-RLØNG
   85 CØNTINUE
      RETURN
      END
```

```
                         HEX     DEC                                 HEX     DEC                                 HEX     DEC
NAME   TYPE CLASS        LØC     WØRDS      NAME   TYPE CLASS        LØC     WØRDS      NAME   TYPE CLASS        LØC     WØRDS
----   ---- -----     ------- -----      ----   ---- -----     ------- -----      ----   ---- -----     ------- -----
CMTØR     R SPRØG     EXTERN             KEN       I SCALR  *0000B V DUMMY      KNS       I SCALR  *00005 V DUMMY
LAT       I SCALR  *00003 V DUMMY        LØNG      I SCALR  *00006 V DUMMY      NAVIN     I SCALR   00000 V     1
NAVIN       SPRØG   00000 F              NEW       I SCALR   00002 V     1      NNS       I SCALR   00001 V     1
RLAT      R SCALR  *00009 V DUMMY        RLATM     R SCALR  *00004 V DUMMY      RLØM      R SCALR  *00007 V DUMMY
RLØNG     R SCALR  *0000A V DUMMY

         HEX               HEX               HEX               HEX               HEX               HEX
LABEL    LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC      LABEL    LØC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
   60   0000F        70   0001C        75   0001F        80   00022        85   00025

LØCAL VARIABLES (3 WØRDS):

   00000 NAVIN      00001 NNS        00002 NEW

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   COCCC NAVIN

EXTERNAL SUBPRØGRAMS REQUIRED:

   CMTØR      9SETLPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC      HEX
                     WØRDS    WØRDS
                     -----    -----
 GENERATED CØDE:       38     00026
      CØNSTANTS:        2     00002
LØCAL VARIABLES:        3     00003
          TEMPS:        9     00009
                     -----    -----
  TØTAL PRØGRAM:       52     CCC34
```

```
      SUBRØUTINE  NAVØT(RLAT,RLØNG,LAT,RLATM,KNS,
     1LØNG,RLØM,KEW,KDEC)
C
C SUBRØUTINE NAVØT CØNVERTS RADIANS TØ DEG,MIN AND LETTER FØR HEMISPHERE
C
C       USES SUBRØUTINES RTDM0, RTDM1, RTDM2
C
C
        KDEC=KDEC+1
CS       JN=116B
CS       JS=123B
CS       JE=105B
CS       JW=127B
        JN = 1HN
        JS = 1HS
        JE = 1HE
        JW = 1HW
        ALAT=ABS(RLAT)
  410 GØ TØ(420,421,422),KDEC
  420 CALL RTDM0(ALAT,LAT,RLATM)
      GØ TØ 429
  421 CALL RTDM1(ALAT,LAT,RLATM)
      GØ TØ 429
  422 CALL RTDM2(ALAT,LAT,RLATM)
  429  IF(RLAT)430,432,432
  430  KNS=JS
       GØ TØ 435
  432   KNS=JN
  435  ALØNG=ABS(RLØNG)
      GØ TØ(436,437,438),KDEC
  436 CALL RTDM0(ALØNG,LØNG,RLØM)
      GØ TØ 439
  437 CALL RTDM1(ALØNG,LØNG,RLØM)
      GØ TØ 439
  438 CALL RTDM2(ALØNG,LØNG,RLØM)
  439  IF(RLØNG)440,442,442
  440  KEW=JW
       GØ TØ 445
  442  KEW=JE
  445 RETURN
      END
```

```
                               HEX     DEC                                     HEX     DEC                                     HEX     DEC
NAME   TYPE CLASS              LØC     WØRDS       NAME   TYPE CLASS           LØC     WØRDS       NAME   TYPE CLASS           LØC     WØRDS
----   ---- -----            -------   -----       ----   ---- -----         -------   -----       ----   ---- -----         -------   -----
ABS       R SPRØG            INTRIN                ALAT      R SCALR         00005 V       1       ALØNG     R SCALR         00006 V       1
JE        I SCALR            00003 V       1       JN        I SCALR         00001 V       1       JS        I SCALR         00002 V       1
JW        I SCALR            00004 V       1       KDEC      I SCALR        *0000F V   DUMMY       KEW       I SCALR        *0000E V   DUMMY
KNS       I SCALR           *0000B V   DUMMY       LAT       I SCALR        *00009 V   DUMMY       LØNG      I SCALR        *0000C V   DUMMY
NAVØT       SPRØG            00000 F               NAVØT     I SCALR         00000 V       1       RLAT      R SCALR        *00007 V   DUMMY
RLATM     R SCALR           *0000A V   DUMMY       RLØN      R SCALR        *0000D V   DUMMY       RLØNG     R SCALR        *00008 V   DUMMY
RTDM0       SPRØG            EXTERN                RTDM1       SPRØG         EXTERN                RTDM2       SPRØG         EXTERN

         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC
-----   -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
  410   00017        420   0001F        421   00025        422   00028        429   00030        430   00032
  432   00035        435   00037        436   00041        437   00047        438   0004D        439   00052
  440   00054        442   00057        445   00059

LØCAL VARIABLES (7 WØRDS):

   00000 NAVØT      00001 JN         00002 JS         00003 JE         00004 JW         00005 ALAT
   00006 ALØNG

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 NAVØT

INTRINSIC SUBPRØGRAMS USED:

   ABS

EXTERNAL SUBPRØGRAMS REQUIRED:

   RTDM0      RTDM1      RTDM2      9SETLPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                       DEC       HEX
                      WØRDS     WØRDS
                      -----     -----
   GENERATED CØDE:       90     0005A
        CØNSTANTS:        4     00004
  LØCAL VARIABLES:        7     00007
            TEMPS:       10     0000A
                      -----     -----
   TØTAL PRØGRAM:       111     0006F
```

```
      SUBRØUTINE ØBG(K977,GØGR,GØBS,KK)
C  SUBRØUTINE ØBG, CHANGE ØBSERVED GRAVITY IN TWØ
C                     WØRDS TØ GRAVITY LESS 977000.0 IF
C                     KK=1, ØR VISA VERSA FØR KK=-2
C
C
      IF(KK)200,100,100
C  TWØ WØRDS TØ ØNE
  100 A = K977-977
      GØBS=(A * 1000.0)+GØGR
      RETURN
C  ØNE WØRD TØ TWØ
  200 A=GØBS*0.001
      II=A
      B=II
      GØGR=(A-B)*1000.0
      K977=II+977
      RETURN
      END
```

```
                      HEX     DEC                             HEX     DEC                              HEX     DEC
NAME  TYPE CLASS      LØC     WØRDS     NAME  TYPE CLASS      LØC     WØRDS     NAME  TYPE CLASS       LØC     WØRDS
----  ---- -----   -------- -----      ----  ---- -----   -------- -----      ----  ---- -----   --------  -----
A        R SCALR   00001 V      1      B        R SCALR   00003 V      1      GØBS     R SCALR  *00006 V  DUMMY
GØGR     R SCALR  *00005 V  DUMMY      II       I SCALR   00002 V      1      KK       I SCALR  *00007 V  DUMMY
K977     I SCALR  *00004 V  DUMMY      ØBG      R SCALR   00000 V      1      ØBG        SPRØG   00000 P

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC
-----  -----     -----  -----     -----  -----     -----  -----     -----  -----     -----  -----
  100  00009       200  00012

LØCAL VARIABLES (4 WØRDS):

   00000 ØBG        00001 A         00002 II        00003 B

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 ØBG

EXTERNAL SUBPRØGRAMS REQUIRED:

   9ITØR      9RTØI      9SETURN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC      HEX
                    WØRDS    WØRDS
                    -----    -----
  GENERATED CØDE:     35     00023
       CØNSTANTS:      2     00002
 LØCAL VARIABLES:      4     00004
           TEMPS:      5     00005
                    -----    -----
   TØTAL PRØGRAM:     46     0002E
```

```
      SUBRØUTINE ØLINE(ZZ,ZHT,
     A  IDATA,IEØD,IIN,IIØUT,ITAPE,NUMPL,DATA,RLAT,RLØNG,KØGHM,IAGAP,LCN
     BT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTØP,ITØP,RBØT,IBØT,RLEFT,
     C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBØT,FTØP,FLEFT,FRIGT,NDEG,
     D SLAT,SLØNG,BØTMP,XX,YY,INIT,XØLD,YØLD)
C
C       VERSIØN 11 JULY 73 TØ INCLUDE FIDUCIAL SQUARE
C  SUBRØUTINE ØLINE(ZZ,ZHT), PLØTS GRID FØR MERCATØR
C        CHART HAVING NØN-INTEGER BØUNDARIES
C
C
C  SSW(8)  UP TØ SUPRESS PLØTTING ØF GRID
C
C
C       CALLS SUBRØUTINES RTDMC, WHR, ISW, AND CALCØMP RØUTINES
C
C
C
C        INITIALIZING DISTANCE AND CHARACTER HEIGHT CONSTANTS
C
   10 HGT=0.07*ZHT
      SA=0.02*ZZ
      SB=0.05*ZZ
      SC=0.15*ZZ
      SD=0.22*ZZ
      SE=0.18*ZZ
      SF=-0.25*ZZ
      SG=0.26*ZZ
      CALL RTDMC(RTØP,LAT,RLATM)
      CALL RTDMC(RLEFT,LØNG,RLØM)
      FTØP=LAT
      FTØPM=RLATM
      FLEFT=LØNG
      FLFTM=RLØM
      CALL RTDMC(RBØT,LAT,RLATM)
      CALL RTDMC(RRIGT,LØNG,RLØM)
      FBØT=LAT
      FBØTM=RLATM
      FRIGT=LØNG
      FRGTM=RLØM
C  SET ØRIGIN FØR CHART
      CALL WHERE (XØRG, YØRG, RFACT)
CS    CALL WHERE(XØRG,YØRG)
      CALL PLØT (XØRG,YØRG,-3)
      IF(ISW(8))80,20,80
C   ANØTATING CØNSECUTIVE PLØT NUMBER
   20 PLNUM=NUMPL
      CALL NUMBER (SF, SA, HGT, PLNUM, 90., -1)
CS     CALL NUMB(SF,SA,HGT,PLNUM,90.0,-1)
      NUMPL=NUMPL+1
C     ANNØTATING GRID
CS     CALL NUMB(SB,SA,HGT,FLEFT,0.0,-1)
      CALL NUMBER (SB, SA, HGT, FLEFT, 0.0, -1)
      XT=SB+SD
      YT=SA
CS    CALL NUMB(XT,YT,HGT,FLFTM,0.0,-1)
      CALL NUMBER (XT, YT, HGT, FLFTM, 0.0, -1)
      CALL PLØT(0.0,0.0,3)
C  START PLØTTING GRID
```

```
              SLAT=RBØT
              SLØNG=RRIGT
             CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMF,SLAT,SLØNG,BØTMP,XX,YY)
              CALL PLØT (XX,YY,2)
      C      DRAW LEFT AND TØP SIDES ØF FIDUCIAL SQUARE
             XFID=XX+1.0
             YFID=YY-0.5
             CALL PLØT(XFID,YFID,3)
             YFID=YFID+0.5
             CALL PLØT(XFID,YFID,2)
             XFID=XFID+0.5
             CALL PLØT(XFID,YFID,2)
             CALL PLØT(XX,YY,3)
              XT=XX-(2.0*SG)-SB
              YT=YY+SB
      CS      CALL NUMB(XT,YT,HGT,FRIGT,0.0,-1)
              CALL NUMBER (XT, YT, HGT, FRIGT, 0.0, -1)
              XT=XX-SG
              YT=YY+SB
              CALL NUMBER (XT, YT, HGT, FRGTM, 0.0, -1)
      CS      CALL NUMB(XT,YT,HGT,FRGTM,0.0,-1)
               CALL PLØT(XX,YY,3)
              SLAT=RTØP
              SLØNG=RRIGT
             CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMF,SLAT,SLØNG,BØTMP,XX,YY)
              CALL PLØT (XX,YY,2)
              SLAT=RTØP
              SLØNG=RLEFT
             CALL WHR(DEGRA,FDEG2,RDEG2,RLEFT,SINCH,SMF,SLAT,SLØNG,BØTMP,XX,YY)
              CALL PLØT(XX,YY,2)
               XT=XX+SC
               YT=YY-SE
              CALL NUMBER (XT, YT, HGT, FTØP, 0.0, -1)
      CS       CALL NUMB(XT,YT,HGT,FTØP,0.0,-1)
              XT=XT+SG+SB
              CALL NUMBER (XT, YT, HGT, FTØPM, 0.0, -1)
      CS      CALL NUMB(XT,YT,HGT,FTØPM,0.0,-1)
              CALL PLØT (XX,YY,3)
              CALL PLØT(0.0,0.0,2)
              XT=SC
              YT=SD
      CS       CALL NUMB(XT,YT,HGT,FBØT,0.0,-1)
              CALL NUMBER (XT, YT, HGT, FBØT, 0.0, -1)
              XT=XT+SG+SB
      CS      CALL NUMB(XT,YT,HGT,FBØTM,0.0,-1)
              CALL NUMBER (XT, YT, HGT, FBØTM, 0.0, -1)
             ØUTPUT 'SUBRØUTINE ØLINE VERSIØN 11 JULY 73'
      C  FINISHED PLØT AND ANØT BASIC GRID
          80  RETURN
              END
```

```
                           HEX     DEC                                    HEX     DEC                                    HEX     DEC
NAME   TYPE CLASS          LØC     WØRDS      NAME   TYPE CLASS           LØC     WØRDS      NAME   TYPE CLASS           LØC     WØRDS
----   ---- -----        -------   -----      ----   ---- -----         -------   -----      ----   ---- -----         -------   -----
BØTMP     R SCALR  *00040  V DUMMY      DATA          UNUSED*00021  V DUMMY      DEGRA     R SCALR  *00028  V DUMMY
FBØT      R SCALR  *00039  V DUMMY      FBØTM     R SCALR   0000F  V     1      FDEG2     R SCALR  *0002B  V DUMMY
FLEFT     R SCALR  *0003B  V DUMMY      FLFTM     R SCALR   0000E  V     1      FRGTM     R SCALR   00010  V     1
FRIGT     R SCALR  *0003C  V DUMMY      FTØP      R SCALR  *0003A  V DUMMY      FTØPM     R SCALR   0000D  V     1
HGT       R SCALR   00001  V     1      IAGAP         UNUSED*00025  V DUMMY      IBØT          UNUSED*00030  V DUMMY
IDATA         UNUSED*0001B  V DUMMY      IDEG2         UNUSED*0002A  V DUMMY      IEØD          UNUSED*0001C  V DUMMY
IIN           UNUSED*0001D  V DUMMY      IIØLT         UNUSED*0001E  V DUMMY      ILEFT         UNUSED*00032  V DUMMY
INIT          UNUSED*00043  V DUMMY      IRIGT         UNUSED*00034  V DUMMY      ISW       I SPRØG   EXTERN
ITAPE         UNUSED*0001F  V DUMMY      ITØP          UNUSED*0002E  V DUMMY      KDEG2         UNUSED*00029  V DUMMY
KØGHM         UNUSED*00024  V DUMMY      LAT       I SCALR   00009  V     1      LCNT          UNUSED*00026  V DUMMY
LØNG      I SCALR   0000B  V     1      NDEG          UNUSED*0003D  V DUMMY      NUMBER        SPRØG   EXTERN
NUMPL     I SCALR  *00020  V DUMMY      ØLINE         SPRØG   00000  P            ØLINE     R SCALR   00000  V     1
PLNUM     R SCALR   00014  V     1      PLØT          SPRØG   EXTERN             RADEG         UNUSED*00027  V DUMMY
RBØT      R SCALR  *0002F  V DUMMY      RDEG2     R SCALR  *0002C  V DUMMY      RFACT     R SCALR   00013  V     1
RLAT          UNUSED*00022  V DUMMY      RLATM     R SCALR   0000A  V     1      RLEFT     R SCALR  *00031  V DUMMY
RLØM      R SCALR   0000C  V     1      RLØNG         UNUSED*00023  V DUMMY      RRIGT     R SCALR  *00033  V DUMMY
RTDMO         SPRØG   EXTERN             RTØP      R SCALR  *0002D  V DUMMY      SA        R SCALR   00002  V     1
SB        R SCALR   00003  V     1      SC        R SCALR   00004  V     1      SD        R SCALR   00005  V     1
SE        R SCALR   00006  V     1      SF        R SCALR   00007  V     1      SG        R SCALR   00008  V     1
SINCH     R SCALR  *00037  V DUMMY      SLAT      R SCALR  *0003E  V DUMMY      SLGK          UNUSED*00036  V DUMMY
SLØNG     R SCALR  *0003F  V DUMMY      SLTK          UNUSED*00035  V DUMMY      SMP       R SCALR  *00038  V DUMMY
WHERE         SPRØG   EXTERN             WHR           SPRØG   EXTERN             XFID      R SCALR   00017  V     1
XØLD          UNUSED*00044  V DUMMY      XØRG      R SCALR   00011  V     1      XT        R SCALR   00015  V     1
XX        R SCALR  *00041  V DUMMY      YFID      R SCALR   00018  V     1      YØLD          UNUSED*00045  V DUMMY
YØRG      R SCALR   00012  V     1      YT        R SCALR   00016  V     1      YY        R SCALR  *00042  V DUMMY
ZHT       R SCALR  *0001A  V DUMMY      ZZ        R SCALR  *00019  V DUMMY


         HEX              HEX              HEX              HEX              HEX              HEX
LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC     LABEL    LØC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
   10   0003C       2C   00080       80   00176

LØCAL VARIABLES (25 WØRDS):

   00000 ØLINE       00001 HGT         00002 SA          00003 SB          00004 SC          00005 SD
   00006 SE          00007 SF          00008 SG          00009 LAT         0000A RLATM       0000B LØNG
   0000C RLØM        0000D FTØPM       0000E FLFTM       0000F FBØTM       00010 FRGTM       00011 XØRG
   00012 YØRG        00013 RFACT       00014 PLNUM       00015 XT          00016 YT          00017 XFID
   00018 YFID

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 ØLINE

EXTERNAL SUBPRØGRAMS REQUIRED:

   ISW        NUMBER     PLØT       RTDMO      WHERE      WHR        F:108      9ENDIØL
   9ITØR      9PRINT     9SETUPN
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC       HEX
                     WØRDS     WØRDS
                     -----     -----
 GENERATED CØDE:      375      00177
      CØNSTANTS:       19      00013
LØCAL VARIABLES:       25      00019
          TEMPS:       46      0002E
                     -----     -----
  TØTAL PRØGRAM:      465      001D1
```

```
      SUBROUTINE PINOT(ITAPE,JTAPE,KK,ISTA,KEY,LAT,LATM,KNS,
     1  LONG,LOM,KEW,VEL,THICK,IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,
     2  DINE,STHIK,CRVN,WGTN,AVWTN,CRVW,WGTW,AVWTW)
C     VERSION OF 20 OCT 1975 TO ELIMINATE STAT,WHAT DIDN'T WORK ANYWAY
C       VERSION OF 11 DEC 1974, TO ADD HANDLING OF PROJ4 OUTPUT
C         VERSION OF 29 MAY 1973, CHECKS FOR CARDS OUT OF ORDER
C         VERSION OF 9 JUNE 1972, REMOVES SETTING OF ITAPE AND JTAPE
C         VERSION OF 14 MARCH 1972,ADDING IMANT TO ARG LIST
C         VERSION OF 7 MARCH 1972,ADDING SORT KEYS
C            VERSION OF 11 MARCH 1971
C  SUBROUTINE PINOT,  FOR INPUT AND OUTPUT OF SEISMIC REFRACTION
C           PROFILE DATA AT SPFMT FORMAT
C
C
C  SSW(26)  UP TO SET JTAPE = 108  AND IREC1 = 2
C  SSW(32)  UP TO READ SPFMT DATA ON TWO CARDS
C  SSW(33)  UP TO WRITE SPFMT DATA ON TWO CARDS
C
      DIMENSION          IDESC(6),VEL(8),THICK(8)
C
C     USES SUBROUTINE ISW,NAVIN
C
C  ***************************************************
      IF(KK)420,400,410
C
C  ITAPE = URN FOR SEISMIC DATA INPUT
C  JTAPE = URN FOR DATA OUTPUT
C  ***************************************************
C
  400 CONTINUE
      IIN = 105
      IIOUT = 108
      ISTAO=0
      IAKEY=0
      RADEG=57.29578
      WRITE (IIOUT,600)
  600 FORMAT ( / 'SUBROUTINE PINOT, VERSION 20 OCT 1975' //)
     IF (ISW(26).EQ.1) WRITE(IIOUT,601);
    $OUTPUT 'IREC1 SET TO 2 TO AVOID SLEWING' ;
    $WRITE (IIOUT,601)
  601 FORMAT(' *******************************')
      RETURN
C
C  READING U OF TORONTO WORLD SEISMIC REFRACTION COMPILATION
  410 CONTINUE
 10   CONTINUE
      IF(ISW(32))15,12,15
   12 READ (ITAPE,990,END=900,ERR=10)
     $                IREC1,ISTA,KEY,LAT,LATM,KNS,LONG,LOM,
     1  KEW,J1,K1,J2,K2,J3,K3,J4,K4,J5,K5,J6,K6,J7,K7,J8,K8,
     2  IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,STHIK,CRVN,
     3  WGTN,AVWTN,CRVW,WGTW,AVWTW
  990 FORMAT(I1,I4,A1,I2,I2,A1,I3,I2,A1,8(I2,I3),I2,I4,4I1,
     1  I1,I2,6A2,1X,2F4.1,F3.1,2F6.0,1X,F3.1,2F6.0,5X,2I3,I2)
      GO TO 18
   15 READ (ITAPE,991,END=900,ERR=10)
     $                IREC1,ISTA,KEY,LAT,LATM,KNS,LONG,LOM,
     1  KEW,J1,K1,J2,K2,J3,K3,J4,K4,J5,K5,J6,K6,J7,K7,J8,K8,
     2  IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,STHIK,CRVN,
     3  WGTN,AVWTN,CRVW,WGTW,AVWTW
  991  FØRMAT(I1,I4,A1,I2,I2,A1,I3,I2,A1,8(I2,I3),I2,I4,4I1,
     1  I1,I2/10X,6A2,1X,2F4.1,F3.1,2F6.0,1X,F3.1,2F6.0,5X,2I3,I2)
   18  CØNTINUE
       IF(ISW(32))22,30,22
C        CHECK FØR CARDS ØUT ØF ØRDER
   22  IF(IREC1-1)24,30,24
   24 IF(IREC1.EQ.8)KK=8;RETURN
      ØUTPUT 'IREC1 .NE. 1'
       ØUTPUT ISTAØ
       READ(ITAPE,25)
   25  FØRMAT(1X)
       GØ TØ 15
   30  VEL(1)=(FLØAT(J1))*0.1
       VEL(2)=(FLØAT(J2))*0.1
       VEL(3)=(FLØAT(J3))*0.1
       VEL(4)=(FLØAT(J4))*0.1
       VEL(5)=(FLØAT(J5))*0.1
       VEL(6)=(FLØAT(J6))*0.1
       VEL(7)=(FLØAT(J7))*0.1
       VEL(8)=(FLØAT(J8))*0.1
       THICK(1)=(FLØAT(K1))*0.1
       THICK(2)=(FLØAT(K2))*0.1
       THICK(3)=(FLØAT(K3))*0.1
       THICK(4)=(FLØAT(K4))*0.1
       THICK(5)=(FLØAT(K5))*0.1
       THICK(6)=(FLØAT(K6))*0.1
       THICK(7)=(FLØAT(K7))*0.1
       THICK(8)=(FLØAT(K8))*0.1
       ISTAØ=ISTA
   98  RETURN
C
C  ØUTPUT RECØRD
C
  420  CØNTINUE
       LTKEY=LAT+90
       RLATM=LATM
       RLØM=LØM
       CALL NAVIN(LAT,RLATM,KNS,LØNG,RLØM,KEW,RLAT,RLØNG)
C      CALCULATING SØRTING KEYS
       PLAT=(RLAT*RADEG)+90
       PLØNG=(RLØNG*RADEG)+180
       LTKEY=PLAT
       LGKEY=PLØNG
       IF(ISW(26))430,435,430
  430  JTAPE=108
      IREC1=2
       GØ TØ 440
  435  IF(ISW(33))460,440,460
  440  WRITE(JTAPE,990)IREC1,ISTA,KEY,LAT,LATM,KNS,LØNG,LØM,
     1  KEW,J1,K1,J2,K2,J3,K3,J4,K4,J5,K5,J6,K6,J7,K7,J8,K8,
     2  IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,STHIK,CRVN,
     3  WGTN,AVWTN,CRVW,WGTW,AVWTW
     4 ,LTKEY,LGKEY,IAKEY
       RETURN
  460  WRITE(JTAPE,991)IREC1,ISTA,KEY,LAT,LATM,KNS,LØNG,LØM,
     1  KEW,J1,K1,J2,K2,J3,K3,J4,K4,J5,K5,J6,K6,J7,K7,J8,K8,
     2  IMANT,NELEV,N1,N2,N3,N4,MET,IYR,IDESC,DINE,STHIK,CRVN,
     3  WGTN,AVWTN,CRVW,WGTW,AVWTW
     4 ,LTKEY,LGKEY,IAKEY
```

```
      RETURN
  900 CØNTINUE
      WRITE(IIØUT,902)
  902 FØRMAT('EØF FØUND, PRØCESSING CØMPLETED')
      KK=9
      RETURN
      END
```

```
                        HEX      DEC                             HEX      DEC                              HEX      DEC
NAME    TYPE CLASS      LØC      WØRDS    NAME    TYPE CLASS      LØC      WØRDS    NAME    TYPE CLASS      LØC      WØRDS
----    ---- -----    -------    -----    ----    ---- -----    -------    -----    ----    ---- -----    -------    -----
AVWTN      R SCALR   *00039 V   DUMMY     AVWTW      R SCALR   *0003C V   DUMMY     CRVN       R SCALR   *00037 V   DUMMY
CRVW       R SCALR   *0003A V   DUMMY     DINE       R SCALR   *00035 V   DUMMY     FLØAT      R SPRØG    INTRIN
IAKEY      I SCALR    00004 V       1     IDESC      I ARRAY   *00034 V   DUMMY     IIN        I SCALR    00001 V       1
IIØUT      I SCALR    00002 V       1     IMANT      I SCALR   *0002C V   DUMMY     IREC1      I SCALR    00006 V       1
ISTA       I SCALR   *00022 V   DUMMY     ISTAØ      I SCALR    000C3 V       1     ISW        I SPRØG    EXTERN
ITAPE      I SCALR   *0001F V   DUMMY     IYR        I SCALR   *00033 V   DUMMY     JTAPE      I SCALR   *00020 V   DUMMY
J1         I SCALR    00007 V       1     J2         I SCALR    00009 V       1     J3         I SCALR    0000B V       1
J4         I SCALR    0000D V       1     J5         I SCALR    0000F V       1     J6         I SCALR    00011 V       1
J7         I SCALR    00013 V       1     J8         I SCALR    00015 V       1     KEW        I SCALR   *00029 V   DUMMY
KEY        I SCALR   *00023 V   DUMMY     KK         I SCALR   *00021 V   DUMMY     KNS        I SCALR   *00026 V   DUMMY
K1         I SCALR    00008 V       1     K2         I SCALR    0000A V       1     K3         I SCALR    0000C V       1
K4         I SCALR    0000E V       1     K5         I SCALR    00010 V       1     K6         I SCALR    00012 V       1
K7         I SCALR    00014 V       1     K8         I SCALR    00016 V       1     LAT        I SCALR   *00024 V   DUMMY
LATM       I SCALR   *00025 V   DUMMY     LGKEY      I SCALR    0001E V       1     LØM        I SCALR   *00028 V   DUMMY
LØNG       I SCALR   *00027 V   DUMMY     LTKEY      I SCALR    00017 V       1     MET        I SCALR   *00032 V   DUMMY
NAVIN        SPRØG    EXTERN              NELEV      I SCALR   *0002D V   DUMMY     N1         I SCALR   *0002E V   DUMMY
N2         I SCALR   *0002F V   DUMMY     N3         I SCALR   *00030 V   DUMMY     N4         I SCALR   *00031 V   DUMMY
PINØT      R SCALR    00000 V       1     PINØT        SPRØG    00000 P             PLAT       R SCALR    0001C V       1
PLØNG      R SCALR    0001D V       1     RADEG      R SCALR    00005 V       1     RLAT       R SCALR    0001A V       1
RLATM      R SCALR    00018 V       1     RLØM       R SCALR    00019 V       1     RLØNG      R SCALR    0001B V       1
STHIK      R SCALR   *00036 V   DUMMY     THICK      R ARRAY   *0002B V   DUMMY     VEL        R ARRAY   *0002A V   DUMMY
WGTN       R SCALR   *00038 V   DUMMY     WGTW       R SCALR   *0003B V   DUMMY

        HEX             HEX             HEX             HEX             HEX             HEX
LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC     LABEL   LØC
-----  -----    -----  -----    -----  -----    -----  -----    -----  -----    -----  -----
   10  00067       12  0006C       15  000BC       18  0010C       22  00111       24  00114
   25  00130       30  00133       98  00185      400  00027      410  00067      420  00186
  430  001AC      435  001B1      440  001B6      460  001EC      600  00035      601  0005C
  900  00222      902  00226      990  000A0      991  000F0

LØCAL VARIABLES (31 WØRDS):

   00000 PINØT     00001 IIN       00002 IIØUT     00003 ISTAØ     00004 IAKEY     00005 RADEG
   00006 IREC1     00007 J1        00008 K1        00009 J2        0000A K2        0000B J3
   0000C K3        0000D J4        0000E K4        0000F J5        00010 K5        00011 J6
   00012 K6        00013 J7        00014 K7        00015 J8        00016 K8        00017 LTKEY
   00018 RLATM     00019 RLØM      0001A RLAT      0001B RLØNG     0001C PLAT      0001D PLØNG
   0001E LGKEY

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 PINØT

INTRINSIC SUBPRØGRAMS USED:

   FLØAT
```

```
      SUBRØUTINE PLANET(KK,RKM,PMASS,GM,PDENS)
C       VERSIØN ØF 23 MAR 1973, CHANGING SENSE SWITCH NUMBER
C          VERSIØN ØF 27 FEB 1973,  INITIAL VERSIØN
C SUBRØUTINE PLANET,  RETURNS PARAMETER VALUES FØR
C
C                PLANET SELECTED BY SSW(38 & 39)
C      SSW(38) = 0  FØR SPHERICAL EARTH
C              = 1  FØR SPHERICAL MØØN
C              = 2  FØR SPHERICAL MARS
C
C RKM = RADIUS IN KILØMETERS
C PMASS = PLANET MASS IN KILØGRAMS
C GM = GM IN DYNES/GRAMS SQUARED
C PDENS = MEAN DENSITY IN GRAMS/CC
C
      DATA ISRT/0/
      IF(ISRT)10,5,10
    5 ØUTPUT 'SUBRØUTINE PLANET, VERSIØN ØF 23 MAR, 1973'
  10   IP= ISW(38)
       IF(IP)20,20,30
C SPHERICAL EARTH
  20  RKM= 6371.2213
      PMASS= 5.983E+24
      GM= 3.990661E+20
      PDENS= 5.52
      GØ TØ 900
  30  CØNTINUE
      GØ TØ(40,50)IP
C SPHERICAL MØØN
  40  RKM=1738.0
      PMASS= 7.3554E+22
C          REF= FIELDER,1961,P.245
      GM= 4.90605E+18
      PDENS= 3.34
C REF= FIELDER,1961,P. 245
      GØ TØ 900
C SPHERICAL MARS
  50  RKM=3394.0
C REF = LØRELL ET AL., 1972, SCIENCE, V.175, P. 3179
      PMASS= 0.
      GM= 0.
      PDENS= 3.96
      GØ TØ 900
 900  CØNTINUE
      KK= IP
      RETURN
      END
```

```
                          HEX      DEC                                 HEX      DEC                                 HEX      DEC
NAME   TYPE CLASS         LOC      WORDS      NAME   TYPE CLASS        LOC      WORDS      NAME   TYPE CLASS        LOC      WORDS
----   ---- -----       -------    -----      ----   ---- -----      -------    -----      ----   ---- -----      -------    -----
GM        R SCALR     *00006 V   DUMMY        IP        I SCALR     00002 V        1       ISRT      I SCALR     00001 V        1
ISW       I SPROG      EXTERN                 KK        I SCALR    *00003 V    DUMMY       PDENS     R SCALR    *00007 V    DUMMY
PLANET      SPROG      00000 P                PLANET    R SCALR     00000 V        1       PMASS     R SCALR    *00005 V    DUMMY
RKM       R SCALR     *00004 V   DUMMY


         HEX                 HEX                 HEX                 HEX                 HEX                 HEX
LABEL    LOC        LABEL    LOC        LABEL    LOC        LABEL    LOC        LABEL    LOC        LABEL    LOC
-----   -----       -----   -----       -----   -----       -----   -----       -----   -----       -----   -----
    5   0000A          10   0001A          20   00020          30   00029          40   00030          50   00039
  900   00042

LOCAL VARIABLES (3 WORDS):

   00000 PLANET     00001 ISRT       00002 IP

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 PLANET

EXTERNAL SUBPROGRAMS REQUIRED:

   ISW       F:108     9ENDIOL    9PRINT     9SETUPN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                     DEC       HEX
                    WORDS     WORDS
                    -----     -----
  GENERATED CODE:     69      00045
       CONSTANTS:     11      0000B
 LOCAL VARIABLES:      3      00003
           TEMPS:      6      00006
                    -----     -----
   TOTAL PROGRAM:     89      00059
```

```
      SUBROUTINE PLOTA(NO,A,N,M,NL,NS,ISCALE,IZERO,TMIN,TMAX)
C     CATALOG NUMBER 890004   PLOT
C      NOTE THAAT THE NAME HAS BEEN CHANGED FROM PLOT TO PLOTA
C     TO AVOID CONFLICT WITH THE CALCOMP SUBROUTINES
C      NO= PLOT NUMBER-- THIS APPEARS AST THE START OF THE PLOT
C      A ---- THE ARRAY IN WHICH THE INDEPENDANT VARIABLE AND THE
C      DEPENDANT VARIABLES ARE STORED COLUM WISE.   IF THE ARRAY IS DIME(>23():
C      DEPENDANT VARIABLES ARE STORED COLUM WISE.   IF THE ARRAY IS DI
C      DIMENSIONED A(N,M) IN THE CALLING PROGRAM  THE INDEPENDANT VARIAB
C      LE IS IN A(1,1) THRU A(N,1), THE FIRST VARIABLE TO BE PLOTTED IS
C      STORED IN A(1,2) THRU A(N,2) AND SO ON.
C      NL --- THE NUMBER OF POINTS IN EACH COLUM OF THE ARRAY  THAT
C      WE WISH TO PLOT.
C      NS =1 TO REORDER THE ARRAY SO THAT THE VALUES OF THE INDEPENDANT
C      VARIABLE / INCRE
C      VARIABLE ARE STORED IN INCREAASING ORDER.
C      =1  THE INDEPENDANT VARIABLE IS ALREADY STORED IN INCREASING ORDE
C      ORDER
C
C
C
C
C
C
C      ISCALE =0   SCALE THE ARRAY
C      ISCALE =1 DO NOT SCALE THE ARRAY , USE THE LIMITS TMAX ,TMIN
C       AND IF IT IS GREATER THAN TMAX OR TMIN PUT THE VARIABLE AT THE
C      EDGE
C       IZERO =0 DO NOT PUT IN ZERO LINE, =1  PUT IN ZERO LINE
C     TMAX, TMIN        MAXIMUM AND MINIMUM VALUES PLOTTED IF ISCALE=1
      DIMENSION OUT(103),YPR(11),ANG(9),A(1)
      DATA BLANK,ANG/' ','1','2','3','4','5','6','7' ,'8','9'/
       REAL LINE
       DATA LINE/'|'/
    1 FORMAT(1H1,60X,7H CHART ,I3,//)
    2 FORMAT(1H ,F11.4,4X,103A1)
    3 FORMAT ('              |')
    7 FORMAT(1H-,16X,'*',10('---------*'))
    8 FORMAT(1H0,9X,11F10.4)
       YMAX=TMAX
       YMIN=TMIN
      IOT=108
      NLL=NL
      IF(NS) 16, 16, 10
   10 DO 15 I=1,N
      DO 14 J=I,N
      IF(A(I)-A(J)) 14, 14, 11
   11 L=I-N
      LL=J-N
      DO 12 K=1,M
      L=L+N
      LL=LL+N
      F=A(L)
      A(L)=A(LL)
   12 A(LL)=F
   14 CONTINUE
   15 CONTINUE
   16 IF(NLL) 20, 18, 20
   18 NLL=50
```

```
 2C WRITE(IØT,1)NØ
      WRITE(IØT,7)
    XSCAL=(A(NLL)-A(1))/(FLØAT(NLL-1))
      IF(ISCALE.EQ.1) GØ TØ 42
    YMIN=1.0E75
    YMAX=-1.0E75
     DØ 40 MC=1,M-1
     M1=N*MC+1
     M2=N*MC+NLL
    DØ 40 J=M1,M2
    IF(A(J)-YMIN) 28,26,26
 26 IF(A(J)-YMAX) 40,40,30
 28 YMIN=A(J)
    GØ TØ 40
 3C YMAX=A(J)
 4C CØNTINUE
42    CØNTINUE
    YSCAL=(YMAX-YMIN)/100.0
    XB=A(1)
    L=1
    MY=M-1
    DØ 8C I=1,NLL
    F=I-1
     XPR=A(L)
 5C DØ 55 IX=1,102
 55 ØUT(IX)=BLANK
     ØUT(1)=LINE
     ØUT(103)=LINE
     IF(IZERØ.EQ.0) GØ TØ 59
     JZ=-YMIN/YSCAL+2.
     IF(JZ>1 .AND.JZ<103) ØUT(JZ)=LINE
59   CØNTINUE
    DØ 60 J=1,MY
    LL=L+J*N
    JP=((A(LL)-YMIN)/YSCAL)+2.0
     IF(JP>103) ØUT(103)=ANG(J) ; GØ TØ 60
     IF(JP<1) ØUT(1)=ANG(J) ;GØ TØ 60
    ØUT(JP)=ANG(J)
 6C CØNTINUE
    WRITE(IØT,2)XPR,(ØUT(IZ),IZ=1,103)
    L=L+1
    GØ TØ 8C
 7C WRITE(IØT,3)
 8C CØNTINUE
    WRITE(IØT,7)
    YPR(1)=YMIN
    DØ 9C KN=1,9
 9C YPR(KN+1)=YPR(KN)+YSCAL*10.0
    YPR(11)=YMAX
    WRITE(IØT,8)(YPR(IP),IP=1,11)
78  FØRMAT( 10(E11.6,1X))
    RETURN
    END
```

```
                             HEX     DEC                                 HEX     DEC                                  HEX     DEC
NAME   TYPE CLASS            LØC     WØRDS      NAME   TYPE CLASS        LØC     WØRDS      NAME    TYPE CLASS        LØC     WØRDS
----   ---- -----          -------   -----      ----   ---- -----      -------   -----      ----    ---- -----      -------   -----
A         R ARRAY         *00057 V DUMMY        ANG       R ARRAY     00073 V       9       BLANK      R SCALR     0007C V       1
F         R SCALR          00087 V     1        FLØAT     R SPRØG     INTRIN                I          I SCALR     00082 V       1
IØT       I SCALR          00080 V     1        IP        I SCALR     00095 V       1       ISCALE     I SCALR    *0009C V DUMMY
IX        I SCALR          0009C V     1        IZ        I SCALR     00093 V       1       IZERØ      I SCALR    *0009D V DUMMY
J         I SCALR          00083 V     1        JP        I SCALR     00092 V       1       JZ         I SCALR     00091 V       1
K         I SCALR          00086 V     1        KN        I SCALR     00094 V       1       L          I SCALR     00084 V       1
LINE      R SCALR          0007D V     1        LL        I SCALR     00085 V       1       M          I SCALR    *00099 V DUMMY
MC        I SCALR          00089 V     1        MY        I SCALR     0008E V       1       M1         I SCALR     0008A V       1
M2        I SCALR          0008B V     1        N         I SCALR    *00098 V DUMMY         NL         I SCALR    *0009A V DUMMY
NLL       I SCALR          00081 V     1        NØ        I SCALR    *00096 V DUMMY         NS         I SCALR    *0009B V DUMMY
ØUT       R ARRAY          00001 V   103        PLØTA     R SCALR     00000 V       1       PLØTA        SPRØG     00000 P
TMAX      R SCALR         *0009F V DUMMY        TMIN      R SCALR    *0009E V DUMMY         XB         R SCALR     0008D V       1
XPR       R SCALR          0008F V     1        XSCAL     R SCALR     00088 V       1       YMAX       R SCALR     0007E V       1
YMIN      R SCALR          0007F V     1        YPR       R ARRAY     00068 V      11       YSCAL      R SCALR     0008C V       1


        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC       LABEL   LØC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
    1   0000E         2   00016         3   0001C         7   00021         8   0002A        10   00039
   11   0004C        12   00053        14   0005C        15   00062        16   00066        18   00068
   20   0006A        26   00096        28   00098        30   0009F        40   000A2        42   000AC
   50   000C1        55   000C4        59   000DD        60   000FB        70   00113        78   0013A
   80   00117        90   00125

LØCAL VARIABLES (150 WØRDS):

   00000 FLØTA      000C1 ØUT        00068 YPR        00073 ANG        0007C BLANK      0007D LINE
   0007E YMAX       0007F YMIN       0008C IØT        00081 NLL        00082 I          00083 J
   00084 L          00085 LL         00086 K          00087 F          00088 XSCAL      00089 MC
   0008A M1         0008B M2         0008C YSCAL      0008D XB         0008E MY         0008F XPR
   0009C IX         00091 JZ         00092 JP         00093 IZ         00094 KN         00095 IP

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 FLØTA

INTRINSIC SUBPRØGRAMS USED:

   FLØAT

EXTERNAL SUBPRØGRAMS REQUIRED:

   F:102      F:104      F:106      F:108      9BCDWRIT   9ENDIØL    9IØDATA    9ITØR
   9RTØI      9SETUPN
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC        HEX
                     WØRDS      WØRDS
                     -----      -----
   GENERATED CØDE:    320       00140
        CØNSTANTS:      5       00005
  LØCAL VARIABLES:    150       00096
            TEMPS:     13       0000D
                     -----      -----
    TØTAL PRØGRAM:    488       001E8
```

```
          SUBRØUTINE RETBY
         A( IDATA,IEØC,IIN,IIØUT,ITAPE,NUMPL,DATA,RLAT,RLØNG,KØGHM,IAGAP,LCN
         BT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTØP,ITØP,RBØT,IBØT,RLEFT,
         C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBØT,FTØP,FLEFT,FRIGT,NDEG,
         D SLAT,SLØNG,BØTMP,XX,YY,INIT,XØLD,YØLD)
C
C        SUBRØUTINE RETBY,  TØ SET  CHART BØUNDARIES
C
C
CS         WRITE (IIØUT,1C)
CS 1C   FØRMAT('E BNDS 1 LINE')
CS         READ(IIN,*)ITØP,IBØT,ILEFT,IRIGT
           READ(IIN,5)ITØP,IBØT,ILEFT,IRIGT
      5   FØRMAT (4I5)
          ØUTPUT ITØP, IBØT, ILEFT, IRIGT
           FTØP=ITØP
           FBØT=IBØT
           FLEFT=ILEFT
           FRIGT=IRIGT
           RTØP=FTØP*DEGRA
           RBØT=FBØT*DEGRA
           RLEFT=FLEFT*DEGRA
           RRIGT=FRIGT*DEGRA
          KDEG2=(IRIGT-ILEFT)
          IDEG2=KDEG2
          FDEG2=IDEG2
          RDEG2=FDEG2*DEGRA
           SMP=SINCH/60.C
           RETURN
           END
```

```
                          HEX     DEC                                 HEX     DEC                                 HEX     DEC
NAME   TYPE CLASS         LØC     WØRDS     NAME   TYPE CLASS         LØC     WØRDS     NAME   TYPE CLASS         LØC     WØRDS
----   ---- ------  --------  -----     ----   ---- ------  --------  -----     ----   ---- ------  --------  -----
BØTMP       UNUSED*00026 V DUMMY        DATA        UNUSED*00007 V DUMMY        DEGRA     R SCALR *0000E V DUMMY
FBØT      R SCALR *0001F V DUMMY        FDEG2     R SCALR *00011 V DUMMY        FLEFT     R SCALR *00021 V DUMMY
FRIGT     R SCALR *00022 V DUMMY        FTØP      R SCALR *00020 V DUMMY        IAGAP       UNUSED*0000B V DUMMY
IBØT      I SCALR *00016 V DUMMY        IDATA       UNUSED*000C1 V DUMMY        IDEG2     I SCALR *00010 V DUMMY
IEØC        UNUSED*00002 V DUMMY        IIN       I SCALR *00003 V DUMMY        IIØUT       UNUSED*00004 V DUMMY
ILEFT     I SCALR *00018 V DUMMY        INIT        UNUSED*00029 V DUMMY        IRIGT     I SCALR *0001A V DUMMY
ITAPE       UNUSED*00005 V DUMMY        ITØP      I SCALR *00014 V DUMMY        KDEG2     I SCALR *0000F V DUMMY
KØGHM       UNUSED*0000A V DUMMY        LCNT        UNUSED*0000C V DUMMY        NDEG        UNUSED*00023 V DUMMY
NUMPL       UNUSED*00006 V DUMMY        RADEG       UNUSED*0000D V DUMMY        RBØT      R SCALR *00015 V DUMMY
RDEG2     R SCALR *00012 V DUMMY        RETBY       SPRØG  00000 P              RETBY     R SCALR  00000 V     1
RLAT        UNUSED*00008 V DUMMY        RLEFT     R SCALR *00017 V DUMMY        RLØNG       UNUSED*00009 V DUMMY
RRIGT     R SCALR *00019 V DUMMY        RTØP      R SCALR *00013 V DUMMY        SINCH     R SCALR *0001D V DUMMY
SLAT        UNUSED*00024 V DUMMY        SLGK        UNUSED*0001C V DUMMY        SLØNG       UNUSED*00025 V DUMMY
SLTK        UNUSED*0001B V DUMMY        SMP       R SCALR *0001E V DUMMY        XØLD        UNUSED*0002A V DUMMY
XX          UNUSED*00027 V DUMMY        YØLD        UNUSED*0002B V DUMMY        YY          UNUSED*00028 V DUMMY

          HEX              HEX              HEX              HEX              HEX              HEX
LABEL     LØC    LABEL     LØC    LABEL     LØC    LABEL     LØC    LABEL     LØC    LABEL     LØC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
    5   00036

LØCAL VARIABLES (1 WØRD):

   00000 RETBY

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 RETBY

EXTERNAL SUBPRØGRAMS REQUIRED:

   F:101      F:103      F:105      F:108      9BCDREAD   9IØDATA    9ITØR      9PRINT
   9SETLPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC      HEX
                     WØRDS    WØRDS
                     -----    -----
   GENERATED CØDE:    117     00075
        CØNSTANTS:      1     00001
  LØCAL VARIABLES:      1     00001
            TEMPS:     44     0002C
                     -----    -----
    TØTAL PRØGRAM:    163     000A3
```

```
      SUBROUTINE RTOM2(RAD,IDEG,AMIN)
C  SUBROUTINE RTODM TO CONVERT RADIANS (RAD) TO
C     DEGREES (IDEG) AND MINUTES (AMIN)
C  FOR AMIN WITH 2 DIGITS TO RIGHT OF DECIMAL
      B = RAD*57.29578
      A=ABS(B)
      A=A+0.00005
      A=SIGN(A,B)
      IDEG=A
      A = IDEG
      AMIN = (B-A)*60.0
      AMIN = SIGN(AMIN,RAD)
      RETURN
      END
```

```
                        HEX     DEC                              HEX     DEC                              HEX     DEC
NAME  TYPE CLASS        LØC     WØRDS     NAME  TYPE CLASS       LØC     WØRDS     NAME  TYPE CLASS       LØC     WØRDS
----  ---- -----      -------   -----     ----  ---- -----     -------   -----     ----  ---- -----     -------   -----
A        R SCALR      00002 V       1     ABS      R SPRØG     INTRIN              AMIN     R SCALR   *00005 V  DUMMY
B        R SCALR      00001 V       1     IDEG     I SCALR   *00004 V  DUMMY       RAD      R SCALR   *00003 V  DUMMY
RTDM2      SPRØG      00000 P             RTDM2    R SCALR    00000 V       1      SIGN     R SPRØG    INTRIN

LØCAL VARIABLES (3 WØRDS):

   00000 RTDM2      00001 B          00002 A

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 RTDM2

INTRINSIC SUBPRØGRAMS USED:

   ABS        SIGN

EXTERNAL SUBPRØGRAMS REQUIRED:

   9ITØR      9RTØI      9SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC       HEX
                    WØRDS     WØRDS
                    -----     -----
  GENERATED CØDE:     35      00023
       CØNSTANTS:      3.     00003
 LØCAL VARIABLES:      3      00003
           TEMPS:      4      00004
                    -----     -----
   TØTAL PRØGRAM:     45      0002D
```

```
      SUBRØUTINE RTØDM(RAD,IDEG,AMIN)
C  SUBRØUTINE RTØDM TØ CØNVERT RADIANS (RAD) TØ
C     DEGREES (IDEG) AND MINUTES (AMIN)
C  FØR AMIN WITH 0 DIGITS TØ RIGHT ØF DECIMAL
      B = RAD*57.29578
      A=ABS(B)
      A=A+0.005
      A=SIGN(A,B)
      IDEG=A
      A = IDEG
      AMIN = (B-A)*60.0
      AMIN = SIGN(AMIN,RAD)
      RETURN
      END
```

```
                    HEX      DEC                             HEX      DEC                             HEX      DEC
NAME  TYPE CLASS    LØC      WØRDS      NAME  TYPE CLASS     LØC      WØRDS     NAME  TYPE CLASS     LØC      WØRDS
----  ---- -----  -------    -----      ----  ---- -----   -------    -----     ----  ---- -----   -------    -----
A        R SCALR  00002 V        1      ABS      R SPRØG   INTRIN               AMIN     R SCALR *00005 V   DUMMY
B        R SCALR  00001 V        1      IDEG     I SCALR *00004 V   DUMMY       RAD      R SCALR *00003 V   DUMMY
RTØDM      SPRØG  00000 P               RTØDM    R SCALR  00000 V       1       SIGN     R SPRØG   INTRIN

LØCAL VARIABLES (3 WØRDS):

   00000 RTØDM       00001 B           00002 A

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 RTØDM

INTRINSIC SUBPRØGRAMS USED:

   ABS         SIGN

EXTERNAL SUBPRØGRAMS REQUIRED:

   9ITØR       9RTØI       9SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC        HEX
                   WØRDS      WØRDS
                   -----      -----
 GENERATED CØDE:     35       00023
      CØNSTANTS:      3       00003
LØCAL VARIABLES:      3       00003
          TEMPS:      4       00004
                   -----      -----
  TØTAL PRØGRAM:     45       0002D
```

```
      SUBRØUTINE SIMUL(N,A,X,EPS,INDIC,NRC,DETER)
C                                                                       SIMU0001
C        WHEN INDIC IS NEGATIVE, SIMUL CØMPUTES THE INVERSE ØF THE N BY SIMU0002
C        N MATRIX A IN PLACE.  WHEN INDIC IS ZERØ, SIMUL CØMPUTES THE   SIMU0003
C        N SØLUTIØNS X(1)...X(N) CØRRESPØNDING TØ THE SET ØF LINEAR     SIMU0004
C        EQUATIØNS WITH AUGMENTED MATRIX ØF CØEFFICIENTS IN THE N BY    SIMU0005
C        N+1 ARRAY A AND IN ADDITIØN CØMPUTES THE INVERSE ØF THE        SIMU0006
C        CØEFFICIENT MATRIX IN PLACE AS ABØVE.  IF INDIC IS PØSITIVE,   SIMU0007
C        THE SET ØF LINEAR EQUATIØNS IS SØLVED BUT THE INVERSE IS NØT   SIMU0008
C        CØMPUTED IN PLACE. THE GAUSS-JØRDAN CØMPLETE ELIMINATIØN METHØDSIMU0009
C        IS EMPLØYED WITH THE MAXIMUM PIVØT STRATEGY.  RØW AND CØLUMN   SIMU0010
C        SUBSCRIPTS ØF SUCCESSIVE PIVØT ELEMENTS ARE SAVED IN ØRDER IN  SIMU0011
C        THE IRØW AND JCØL ARRAYS RESPECTIVELY.  K IS THE PIVØT CØUNTER,SIMU0012
C        PIVØT THE ALGEBRAIC VALUE ØF THE PIVØT ELEMENT, MAX            SIMU0013
C        THE NUMBER ØF CØLUMNS IN A AND DETER THE DETERMINANT ØF THE    SIMU0014
C        CØEFFICIENT MATRIX.  THE SØLUTIØNS ARE CØMPUTED IN THE (N+1)TH SIMU0015
C        CØLUMN ØF A AND THEN UNSCRAMBLED AND PUT IN PRØPER ØRDER IN    SIMU0016
C        X(1)...X(N) USING THE PIVØT SUBSCRIPT INFØRMATIØN AVAILABLE    SIMU0017
C        IN THE IRØW AND JCØL ARRAYS.  THE SIGN ØF THE DETERMINANT IS   SIMU0018
C        ADJUSTED, IF NECESSARY, BY DETERMINING IF AN ØDD ØR EVEN NUMBERSIMU0019
C        ØF PAIRWISE INTERCHANGES IS REQUIRED TØ PUT THE ELEMENTS ØF THESIMU0020
C        JØRD ARRAY IN ASCENDING SEQUENCE WHERE JØRD(IRØW(I)) = JCØL(I).SIMU0021
C        IF THE INVERSE IS REQUIRED, IT IS UNSCRAMBLED IN PLACE USING   SIMU0022
C        Y(1)...Y(N) AS TEMPØRARY STØRAGE.  THE VALUE ØF THE DETERMINANTSIMU0023
C        IS RETURNED AS THE VALUE ØF THE FUNCTIØN.  SHØULD THE PØTENTIALSIMU0024
C        PIVØT ØF LARGEST MAGNITUDE BE SMALLER IN MAGNITUDE THAN EPS,   SIMU0025
C        THE MATRIX IS CØNSIDERED TØ BE SINGULAR AND A TRUE ZERØ IS     SIMU0026
C        RETURNED AS THE VALUE ØF THE FUNCTIØN.                         SIMU0027
C                                                                       SIMU0028
C     REFERENCE: CARNAHAN, LUTHER AND WILKES (1969)                     SIMU0029
C                APPLIED NUMERICAL METHØDS. WILEY, NEW YØRK.            SIMU0030
C                                                                       SIMU0031
C     CØNVERTED TØ XDS FØRTRAN IV-H BY H. PERKINS, APRIL, 1970.         SIMU0032
C                                                                       SIMU0033
      DIMENSIØN IRØW(50), JCØL(50), JØRD(50), Y(50), A(NRC,NRC), X(N)   SIMU0035
C                                                                       SIMU0036
      MAX = N                                                           SIMU0037
      IF ( INDIC.GE.0 )  MAX = N + 1                                    SIMU0038
C                                                                       SIMU0039
C     .....IS N LARGER THAN 50 .....                                    SIMU0040
      IF ( N.LE.50 )   GØ TØ 5                                          SIMU0041
      WRITE(108,200)                                                    SIMU0042
      SIMUL = 0.                                                        SIMU0043
      RETURN                                                            SIMU0044
C                                                                       SIMU0045
C     ..... BEGIN ELIMINATIØN PRØCEDURE .....                           SIMU0046
    5 DETER = 1.                                                        SIMU0047
      DØ 18   K = 1, N                                                  SIMU0048
      KM1 = K - 1                                                       SIMU0049
C                                                                       SIMU0050
C     ..... SEARCH FØR THE PIVØT ELEMENT .....                          SIMU0051
      PIVØT = 0.                                                        SIMU0052
      DØ 11   I = 1, N                                                  SIMU0053
      DØ 11   J = 1, N                                                  SIMU0054
C     ..... SCAN IRØW AND JCØL ARRAYS FØR INVALID PIVØT SUBSCRIPTS .....SIMU0055
      IF ( K.EQ.1 )   GØ TØ 9                                           SIMU0056
      DØ 8    ISCAN = 1, KM1                                            SIMU0057
      DØ 8    JSCAN = 1, KM1                                            SIMU0058
      IF ( I.EQ.IRØW(ISCAN)  )   GØ TØ 11                               SIMU0059
    8 IF ( J.EQ.JCØL(JSCAN)  )   GØ TØ 11                                   SIMU0060
    9 IF (DABS(A(I,J)).LE.DABS(PIVØT)  )   GØ TØ 11                         SIMU0061
      PIVØT = A(I,J)                                                        SIMU0062
      IRØW(K) = I                                                           SIMU0063
      JCØL(K) = J                                                           SIMU0064
   11 CONTINUE                                                              SIMU0065
C                                                                           SIMU0066
C     ..... INSURE THAT SELECTED PIVØT IS LARGER THAN EPS .....             SIMU0067
      IF ( DABS(PIVØT).GT.EPS )   GØ TØ 13                                  SIMU0068
      SIMUL = 0.                                                            SIMU0069
      RETURN                                                                SIMU0070
C                                                                           SIMU0071
C     ..... UPDATE THE DETERMINANT VALUE .....                              SIMU0072
   13 IRØWK = IRØW(K)                                                       SIMU0073
      JCØLK = JCØL(K)                                                       SIMU0074
      DETER = DETER*PIVØT                                                   SIMU0075
C                                                                           SIMU0076
C     ..... NØRMALIZE PIVØT RØW ELEMENTS .....                              SIMU0077
      DØ 14   J = 1, MAX                                                    SIMU0078
   14 A(IRØWK,J) = A(IRØWK,J)/PIVØT                                         SIMU0079
C                                                                           SIMU0080
C     ..... CARRY ØUT ELIMINATIØN AND DEVELØP INVERSE .....                 SIMU0081
      A(IRØWK,JCØLK) = 1./PIVØT                                             SIMU0082
      DØ 18   I = 1, N                                                      SIMU0083
      AIJCK = A(I,JCØLK)                                                    SIMU0084
      IF ( I.EQ.IRØWK )   GØ TØ 18                                          SIMU0085
      A(I,JCØLK) = - AIJCK/PIVØT                                            SIMU0086
      DØ 17   J = 1, MAX                                                    SIMU0087
   17 IF ( J.NE.JCØLK )   A(I,J) = A(I,J) - AIJCK*A(IRØWK,J)                SIMU0088
   18 CØNTINUE                                                              SIMU0089
C                                                                           SIMU0090
C     ..... ØRDER SØLUTIØN VALUES (IF ANY) AND CREATE JØRD ARRAY .....      SIMU0091
      DØ 20   I = 1, N                                                      SIMU0092
      IRØWI = IRØW(I)                                                       SIMU0093
      JCØLI = JCØL(I)                                                       SIMU0094
      JØRD (IRØWI) = JCØLI                                                  SIMU0095
   20 IF ( INDIC.GE.0 )   X(JCØLI) = A(IRØWI,MAX)                           SIMU0096
C                                                                           SIMU0097
C     ..... ADJUST SIGN ØF DETERMINANT .....                                SIMU0098
      IF(N.EQ.1)  GØ TØ 24
      INTCH = 0                                                             SIMU0099
      NM1 = N - 1                                                           SIMU0100
      DØ 22  I = 1, NM1                                                     SIMU0101
      IP1 = I + 1                                                           SIMU0102
      DØ 22   J = IP1, N                                                    SIMU0103
      IF ( JØRD(J).GE.JØRD(I))   GØ TØ 22                                   SIMU0104
      JTEMP = JØRD(J)                                                       SIMU0105
      JØRD(J) = JØRD(I)                                                     SIMU0106
      JØRD(I) = JTEMP                                                       SIMU0107
      INTCH = INTCH + 1                                                     SIMU0108
   22 CØNTINUE                                                              SIMU0109
      IF ( INTCH/2*2.NE.INTCH )   DETER = - DETER                           SIMU0110
C                                                                           SIMU0111
C     ..... IF INDIC IS PØSITIVE RETURN WITH RESULTS .....                  SIMU0112
   24 IF ( INDIC.LE.0 )   GØ TØ 26                                          SIMU0113
      SIMUL = DETER                                                         SIMU0114
      RETURN                                                                SIMU0115
C                                                                           SIMU0116
C     ..... IF INDIC IS NEGATIVE ØR ZERØ, UNSCRAMBLE THE INVERSE            SIMU0117
C           FIRST BY RØWS .....                                             SIMU0118
```

```
   26 DØ 28   J = 1, N                                                SIMU0119
      DØ 27   I = 1, N                                                SIMU0120
      IRØWI = IRØW(I)                                                 SIMU0121
      JCØLI = JCØL(I)                                                 SIMU0122
   27 Y(JCØLI) = A(IRØWI,J)                                           SIMU0123
      DØ 28   I = 1, N                                                SIMU0124
   28 A(I,J) = Y(I)                                                   SIMU0125
C     ..... THEN BY CØLUMNS .....                                     SIMU0126
      DØ 30   I = 1,N                                                 SIMU0127
      DØ 29   J = 1, N                                                SIMU0128
      IRØWJ = IRØW(J)                                                 SIMU0129
      JCØLJ = JCØL(J)                                                 SIMU0130
   29 Y(IRØWJ) = A(I,JCØLJ)                                           SIMU0131
      DØ 30   J = 1, N                                                SIMU0132
   30 A(I,J) = Y(J)                                                   SIMU0133
C                                                                     SIMU0134
C     ..... RETURN FØR INDIC NEGATIVE ØR ZERØ .....                   SIMU0135
      SIMUL = DETER                                                   SIMU0136
      RETURN                                                          SIMU0137
C                                                                     SIMU0138
C     ..... FØRMAT FØR ØUTPUT STATEMENT .....                         SIMU0139
  200 FØRMAT( 10H0N TØØ BIG )                                         SIMU0140
C                                                                     SIMU0141
      END                                                             SIMU0142
```

```
                      HEX     DEC                                HEX     DEC                                HEX     DEC
NAME   TYPE CLASS     LØC     WØRDS      NAME   TYPE CLASS       LØC     WØRDS      NAME   TYPE CLASS       LØC     WØRDS
----   ---- -----   -------   -----      ----   ---- -----     -------   -----      ----   ---- -----     -------   -----
A         R ARRAY  *000DD V   DUMMY      AIJCK     R SCALR    000D3 V       1      DABS      D SPRØG    INTRIN
DETER     R SCALR  *000E2 V   DUMMY      EPS       R SCALR   *000DF V   DUMMY      I         I SCALR    000CD V       1
INDIC     I SCALR  *000EC V   DUMMY      INTCH     I SCALR    000C6 V       1      IP1       I SCALR    000D8 V       1
IRØW      I ARRAY   000C1 V      50      IRØWI     I SCALR    000D4 V       1      IRØWJ     I SCALR    000DA V       1
IRØWK     I SCALR   000D1 V       1      ISCAN     I SCALR    000CF V       1      J         I SCALR    000CE V       1
JCØL      I ARRAY   00033 V      50      JCØLI     I SCALR    000D5 V       1      JCØLJ     I SCALR    000DB V       1
JCØLK     I SCALR   000D2 V       1      JØRD      I ARRAY    00065 V      50      JSCAN     I SCALR    000D0 V       1
JTEMP     I SCALR   000D9 V       1      K         I SCALR    000CA V       1      KM1       I SCALR    000CB V       1
MAX       I SCALR   000C9 V       1      N         I SCALR   *000DC V   DUMMY      NM1       I SCALR    000D7 V       1
NRC       I SCALR  *000E1 V   DUMMY      PIVØT     R SCALR    000CC V       1      SIMUL     R SCALR    00000 V       1
SIMUL     R SPRØG   00000 P              X         R ARRAY   *000DE V   DUMMY      Y         R ARRAY    00097 V      50

       HEX                HEX                HEX                HEX                HEX                HEX
LABEL  LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC        LABEL   LØC
-----  -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
    5  00020  [illegible] 00037          9   00043         11   00056         13   0006C         14   00076
   17  00095         18   000AE         20   000C1         22   000E7         24   000F9         26   000FE
   27  00106         28   00112         29   00127         30   00133        200   00143

LØCAL VARIABLES (220 WØRDS):

   00000 SIMUL      000C1 IRØW       00033 JCØL       00065 JØRD       00097 Y          000C9 MAX
   000CA K          000CB KM1        000CC PIVØT      000CD I          000CE J          000CF ISCAN
   000D0 JSCAN      000D1 IRØWK      000D2 JCØLK      000D3 AIJCK      000D4 IRØWI      000D5 JCØLI
   000C6 INTCH      000C7 NM1        000D8 IP1        000D9 JTEMP      000DA IRØWJ      000DB JCØLJ

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 SIMUL

INTRINSIC SUBPRØGRAMS USED:

   DABS

EXTERNAL SUBPRØGRAMS REQUIRED:

   F:108      SENDIØL    9PRINT     9SETUFN
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC       HEX
                     WØRDS     WØRDS
                     -----     -----
 GENERATED CØDE:      329      00149
      CØNSTANTS:        2      00002
LØCAL VARIABLES:      220      000DC
          TEMPS:       12      0000C
                     -----     -----
  TØTAL PRØGRAM:      563      00233
```

```
      SUBROUTINE SPLOT(ISTA,RLAT,RLONG,VEL,THICK,VELW,WATTK,VMANT,XX,YY,
     1   YFAC,ZHT,HGT,AC,AS,ANGB,BDIST)
C  SUBROUTINE SPLOT,  PLOTS SEISMIC REFRACTION PROFILE DATA
C                     IN COLUMN FORM
      DIMENSION         VEL(8),THICK(8)
      DATA RADEG/57.29578/
      NCT=8
C  LABLING COLUMN
      AISTA = ISTA
      XN = -0.10 * ZHT
      YN = 0.40
      XP = (XN*AC)+(YN*AS)
      YP = -1.0*(XN*AS) + (YN*AC)
      XT = XX + XP
      YT = YY+YP
      CALL NUMBER(XT,YT,HGT,AISTA,ANGB,-1)
      CALL PLOT(XX,YY,3)
      IF(ISW(5))490,465,490
  465 XN =-0.10
      YN = 0.40+(0.12*ZHT)
      XP = (XN*AC)+(YN*AS)
      YP = -1.0*(XN*AS) + (YN*AC)
      XT = XX + XP
      YT = YY+YP
      DLONG = RLONG*RADEG
      CALL NUMBER(XT,YT,HGT,DLONG,ANGB,2)
      XN = -0.10
      YN = 0.40+(0.24*ZHT)
      XP = (XN*AC)+(YN*AS)
      YP = -1.0*(XN*AS) + (YN*AC)
      XT = XX + XP
      YT = YY+YP
      DLAT = RLAT*RADEG
      CALL NUMBER(XT,YT,HGT,DLAT,ANGB,2)
      CALL PLOT(XX,YY,3)
C  BEGIN PLOTTING COLUMN
  490 LIND = 0
      MAX = NCT+1
      IF(VELW-0.001)510,510,500
  500 CVEL = VELW
      DOWN = -WATTK/YFAC
      GO TO 100
  510 LIND = LIND + 1
      IF(LIND-MAX)512,530,530
  512 IF(VEL(LIND)-0.001)510,510,520
  520 CVEL = VEL(LIND)
      IF(THICK(LIND)-0.001)522,522,524
  522 IF(CVEL-7.0)524,523,523
  523 DOWN=-(BDIST * 2.0)
      GO TO 100
  524 DOWN = -THICK(LIND)/YFAC
      GO TO 100
  530 IF(VMANT-0.001)550,550,540
  540 CVEL = VMANT
      DOWN = -(BDIST * 2.0)
      VMANT = 0.0
      GO TO 100
C  COMPLETED PLOTTING THIS COLUMN
  550 GO TO 750
```

```
CC
C  PLØTTING CØLUMN INSTRUCTIØNS
CC
C  WRITING TICK LINE AT ANGLE (ANGB)
  100  XP = (BDIST*AC)
       YP = -1.0*(BDIST * AS)
       XT = XX+(ABS(XP))
       YT = YY+YP
       CALL PLØT(XT,YT,2)
       CALL PLØT(XX,YY,3)
C  WRITING VELØCITY VALUE
  110  XN = -0.25 * ZHT
       YN = -0.09 * ZHT
       XP = (XN*AC)+(YN*AS)
       YP = -1.0*(XN*AS)+(YN*AC)
       XT=XX+XP
       YT=YY+YP
       CALL NUMBER(XT,YT,HGT,CVEL,ANGB,1)
       CALL PLØT(XX,YY,3)
C  CØNTINUE PLØTTING DØWNWARD LINE
  120  XP= DØWN *AS
       YP= DØWN *AC
       XX= XX+XP
       YY= YY+YP
       CALL PLØT(XX,YY,2)
       GØ TØ 510
  750  RETURN
       END
```

```
                   HEX    DEC                             HEX    DEC                             HEX    DEC
NAME  TYPE CLASS   LØC    WØRDS      NAME   TYPE CLASS    LØC    WØRDS      NAME  TYPE CLASS     LØC    WØRDS
----  ---- -----  ------- -----      ----   ---- -----  ------- -----       ----  ---- -----   ------- -----
ABS      R SPRØG  INTRIN             AC        R SCALR *0001D V DUMMY      AISTA    R SCALR   00003 V     1
ANGB     R SCALR *0001F V DUMMY      AS        R SCALR *0001E V DUMMY      BDIST    R SCALR  *00020 V DUMMY
CVEL     R SCALR  0000E V     1      DLAT      R SCALR  0000B V     1      DLØNG    R SCALR   0000A V     1
DØWN     R SCALR  0000F V     1      HGT       R SCALR *0001C V DUMMY      ISTA     I SCALR  *00010 V DUMMY
ISW      I SPRØG  EXTERN             LIND      I SCALR  0000C V     1      MAX      I SCALR   0000D V     1
NCT      I SCALR  00002 V     1      NUMBER      SPRØG  EXTERN             PLØT       SPRØG   EXTERN
RADEG    R SCALR  00001 V     1      RLAT      R SCALR *00011 V DUMMY      RLØNG    R SCALR  *00012 V DUMMY
SPLØT  . R SCALR  00000 V     1      SPLØT       SPRØG  00000 P            THICK    R ARRAY  *00014 V DUMMY
VEL      R ARRAY *00013 V DUMMY      VELW      R SCALR *00015 V DUMMY      VMANT    R SCALR  ?00017 V DUMMY
WATTK    R SCALR *00016 V DUMMY      XN        R SCALR  00004 V     1      XP       R SCALR   00006 V     1
XT       R SCALR  00008 V     1      XX        R SCALR *00018 V DUMMY      YFAC     R SCALR  *0001A V DUMMY
YN       R SCALR  00005 V     1      YP        R SCALR  00007 V     1      YT       R SCALR   00009 V     1
YY       R SCALR *00019 V DUMMY      ZHT       R SCALR *0001B V DUMMY

        HEX                HEX                HEX                HEX                HEX                HEX
LABEL   LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC
-----  -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
  100  000C5        110   000ED        120   00118        465   00049        490   0009C        500   000A4
  510  000AB        512   000AE        520   000B3        522   000BA        523   000BD        524   000C2
  530  000C8        540   000C8        550   000D4        750   0012A

LØCAL VARIABLES (16 WØRDS):

   00000 SPLØT      00001 RADEG     00002 NCT       00003 AISTA     00004 XN        00005 YN
   00006 XP         00007 YP        00008 XT        00009 YT        0000A DLØNG     0000B DLAT
   0000C LIND       0000D MAX       0000E CVEL      0000F DØWN

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 SPLØT

INTRINSIC SUBPRØGRAMS USED:

   ABS

EXTERNAL SUBPRØGRAMS REQUIRED:

   ISW        NUMBER      PLØT        9ITØR       9SETUPN
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                    DEC      HEX
                   WØRDS    WØRDS
                   -----    -----
 GENERATED CØDE:    299     0012B
      CØNSTANTS:     16     00010
LØCAL VARIABLES:     16     00010
          TEMPS:     19     00013
                   -----    -----
  TØTAL PRØGRAM:    350     0015E
```

```
      SUBROUTINE SPOT(XX,YY)
C
C  SUBROUTINE SPOT PLOTS A CIRCLE AT DATA POINT
C
C     USES CALCOMP SUBROUTINES
C
      ST = XX + 0.02
      TT = YY - 0.01
      CALL PLOT(ST,TT,3)
      YT = YY + 0.01
      CALL PLOT(ST,YT,2)
      XT = XX + 0.01
      YT = YY + 0.02
      CALL PLOT(XT,YT,2)
      XT = XX - 0.01
      CALL PLOT(XT,YT,2)
      XT = XX - 0.02
      YT = YY + 0.01
      CALL PLOT(XT,YT,2)
      YT = YY - 0.01
      CALL PLOT(XT,YT,2)
      XT = XX - 0.01
      YT = YY - 0.02
      CALL PLOT(XT,YT,2)
      XT = XX + 0.01
      CALL PLOT(XT,YT,2)
      CALL PLOT(ST,TT,2)
      CALL PLOT(XX,YY,3)
      RETURN
      END
```

```
                      HEX     DEC                              HEX     DEC                               HEX     DEC
NAME  TYPE CLASS      LØC     WØRDS     NAME  TYPE CLASS       LØC     WØRDS     NAME  TYPE CLASS        LØC     WØRDS
----  ---- -----    -------   -----     ----  ---- -----     -------   -----     ----  ---- -----      -------   -----
PLØT       SPRØG    EXTERN              SPØT     R SCALR    00000 V      1       SPØT       SPRØG     00000 P
ST       R SCALR    00001 V       1     TT       R SCALR    00002 V      1       XT       R SCALR     00004 V       1
XX       R SCALR   *00005 V   DUMMY     YT       R SCALR    00003 V      1       YY       R SCALR    *00006 V   DUMMY

LØCAL VARIABLES (5 WØRDS):

   00000 SPØT      00001 ST        00002 TT        00003 YT        00004 XT

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 SPØT

EXTERNAL SUBPRØGRAMS REQUIRED:

   PLØT      9SETUP2

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC       HEX
                     WØRDS     WØRDS
                     -----     -----
 GENERATED CØDE:       91      00058
      CØNSTANTS:        6      00006
LØCAL VARIABLES:        5      00005
          TEMPS:        3      00003
                     -----     -----
  TØTAL PRØGRAM:      105      00069
```

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GRAVITY DATA PROCESSING PROGRAMS.(U)

CARL BOWIN

UNCLASSIFIED WOODS HOLE OCEANOGRAPHIC INSTITUTION, MA

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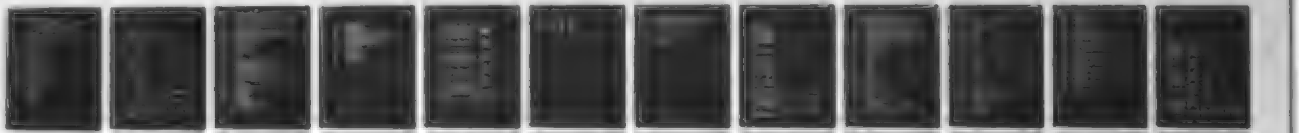

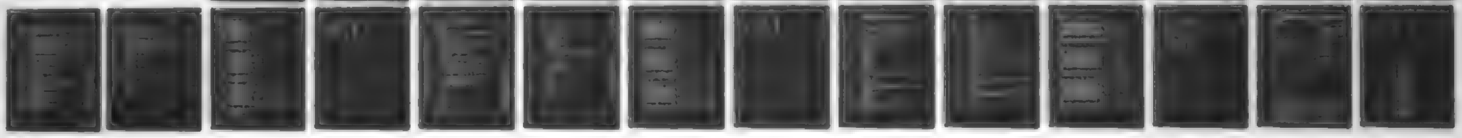

END
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```
      SUBROUTINE SPOT2(XX,YY)
C       USES CALCOMP SUBROUTINES
C
C         MODIFIED TO MAKE SSW(4) DEFAULT NO MARKING        3 OCT 72
C   VERSION OF 20 AUGUST 1971,  CHECKS ISW(4)  TO DEFINE SYMBOL ANNOT
C
C         SSW(4) = 0 FOR SUPPRESSING PLOTTING OF ANY SPOT
C                = 1 FOR PLOTTING A CIRCLE AT DATA POINT
C                = 2  FOR PLOTTING A DOT AT DATA POINT
C
      NSW=ISW(4)
C INCREMENT INDEX BY ONE TO PERMIT USE OF GO TO STATEMENT
      NSW=NSW+1
      GO TO (999,100,200,300,400,500,600,700,800,900)NSW
C
C     TO PLOT A CIRCLE AROUND DATA POINT
  100 ST = XX + 0.02
      TT = YY - 0.01
      CALL PLOT(ST,TT,3)
      YT = YY + 0.01
      CALL PLOT(ST,YT,2)
      XT = XX + 0.01
      YT = YY + 0.02
      CALL PLOT(XT,YT,2)
      XT = XX - 0.01
      CALL PLOT(XT,YT,2)
      XT = XX - 0.02
      YT = YY + 0.01
      CALL PLOT(XT,YT,2)
      YT = YY - 0.01
      CALL PLOT(XT,YT,2)
      XT = XX - 0.01
      YT = YY - 0.02
      CALL PLOT(XT,YT,2)
      XT = XX + 0.01
      CALL PLOT(XT,YT,2)
      CALL PLOT(ST,TT,2)
      CALL PLOT(XX,YY,3)
  999 RETURN
C
C     TO PLOT ONLY A DOT BY LOWERING AND RAISING PEN
  200 CALL PLOT(XX,YY,2)
      CALL PLOT(XX,YY,3)
C
C     OTHER OPTIONS TO BE IMPLEMENTED
  300 RETURN
  400 RETURN
  500 RETURN
  600 RETURN
  700 RETURN
  800 RETURN
  900 RETURN
      END
```

```
NAME  TYPE CLASS    HEX   DEC        NAME  TYPE CLASS    HEX   DEC         NAME  TYPE CLASS    HEX   DEC
                    LØC   WØRDS                          LØC   WØRDS                           LØC   WØRDS
----  ---- -----  ------- -----      ----  ---- -----  ------- -----       ----  ---- -----  ------- -----
ISW      I SPRØG  EXTERN             NSW      I SCALR  00001 V     1       PLØT       SPRØG  EXTERN
SPØT2    R SCALR  00000 V     1      SPØT2      SPRØG  00000 P             ST       R SCALR  00002 V     1
TT       R SCALR  00003 V     1      XT       R SCALR  00005 V     1       XX       R SCALR *00006 V DUMMY
YT       R SCALR  00004 V     1      YY       R SCALR *00007 V DUMMY

LABEL   HEX     LABEL   HEX     LABEL   HEX     LABEL   HEX     LABEL   HEX     LABEL   HEX
        LØC             LØC             LØC             LØC             LØC             LØC
-----  -----    -----  -----    -----  -----    -----  -----    -----  -----    -----  -----
  100  00018      200  0006F      300  00079      400  0007A      500  0007B      600  0007C
  700  0007D      800  0007E      900  0007F      999  0006E

LØCAL VARIABLES (6 WØRDS):

   00000 SPØT2      00001 NSW      00002 ST      00003 TT      00004 YT      00005 XT

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 SPØT2

EXTERNAL SUBPRØGRAMS REQUIRED:

   ISW        PLØT        9SETUP2

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC      HEX
                     WØRDS    WØRDS
                     -----    -----
   GENERATED CØDE:    128     00080
        CØNSTANTS:      7     00007
  LØCAL VARIABLES:      6     00006
            TEMPS:      3     00003
                     -----    -----
    TØTAL PRØGRAM:    144     0009C
```

```
      SUBRØUTINE TIDAL(RLAT,RLØNG,IY,ID,IH,IM,CLS,HØNK,DTD)
C     WRITTEN BY C. GANTAR ACCØRDING TØ LØNGMAN AND USCGS FØRMULAE
C     ADAPTED FØR SIGMA-7  AUG. 69 BY J. WØLFE
C      THE ØUT PUT ØF THE PRØGRAM HAS BEEN CHECKED WITH THE G. PRØS.
C      BØØK FØR THE YEAR 69   WEIRD RESULTS BUT ARE IN GENERAL AGREEMENT
C
C     RLAT(+ IF NØRTH),RLØNG(+ IF EAST)=GEØGR CØØRD.IN RADIANS
C     IY=YEAR-1900  ID=DAY,PRØGRESSIVE ØF THE YEAR
C     IH,IM=HØUR, MINUTES (GMT)
C     CLS=TIDAL CØRRECTIØN(MGAL)
C     HØNK=HØNKASALØ TERM(MGAL) TØ BE ADDED TØ CLS
      DØUBLE PRECISIØN DIY,DID,DTD,DBIS,CENT,DS,S,DH,H,DP,DN,DP1,P1,P,
     1ØMEGA,SP,DSP,SHP,DSH,S1,SENØM,CØSØM,SENNE,CØSNE,SENNU,SENAL,CØSAL,
     2DE1,L,L1,CHI,CHI1,CSZ,CST,DMUN,RHØ,PC1,PC2,PC3,DSUN,AI,SENI,FNU
      DØUBLE PRECISIØN N
      DØUBLE PRECISIØN RLAT,RLØNG,CASØL
      DØUBLE PRECISIØN ARCØS,ARSIN
      DØUBLE PRECISIØN DYM,DIBIS
      IMPLICIT REAL (N,L)
      X=FLØAT(IY)/4.+.1
      X1=X-FLØAT(INT(X))
      IBIS=INT(X)
      IF(X1.LT.0.2)IBIS=IBIS-1
      DIY=IY
      DID=ID-1
      DIH=IH
      DYM=IM
      DIBIS=IBIS
      DTD=DIY*365.D0+DIBIS+0.5D0+DID+.041666667D0*DIH+.000694444D0*DYM
      CENT=DTD/36525.D0
      DS=4.720009D0+8399.709275D0*CENT+.000035D0*CENT**2
      S=DMØD(DS,6.28318530718D0)
      DH=4.881628D0+628.331951D0*CENT+0.000005D0*CENT**2
      H=DMØD(DH,6.28318530718D0)
      DP=5.835152D0+71.018041D0*CENT-0.00018D0*CENT**2
      P=DMØD(DP,6.28318530718D0)
      DN=4.523603D0-33.757146D0*CENT+0.000036D0*CENT**2
      N=DMØD(DN,6.28318530718D0)
      DP1=4.908229D0+0.030003D0*CENT+0.000008D0*CENT**2
      P1=DMØD(DP1,6.28318530718D0)
      ØMEGA=0.409320D0-0.000227D0*CENT
      SP=S-P
      DSP=2.D0*SP
      SHP=S-2.D0*H+P
      DSH=2.D0*(S-H)
      S1=S+.1098D0*DSIN(SP)+.0037675D0*DSIN(DSP)+.0154001D0*DSIN(SHP)+.0
     1076939D0*DSIN(DSH)
      SENØM=DSIN(ØMEGA)
      CØSØM=DCØS(ØMEGA)
      SENNE=DSIN(N)
      CØSNE=DCØS(N)
      AI=ARCØS(DABS(.99597036*CØSØM-.08968308*SENØM*CØSNE))
      SENI=DSIN(AI)
      SENNU=.08968308D0*SENNE/SENI
      FNU=ARSIN(SENNU)
      SENAL=SENØM*SENNE/SENI
      CØSAL=CØSNE*DCØS(FNU)+SENNE*SENNU*CØSØM
      CASØL=1.D0+CØSAL
      L=S1-N+2.D0*DATAN2(SENAL,CASØL)
      DE1=.03350208D0-.000084D0*CENT
      L1=H+DE1*DSIN(H-P1)
      GH=57.29578D0*H
      GLØNG=-57.29578D0*RLØNG
      TH=FLØAT(IH)+FLØAT(IM)/60.
      CHI1=.01745329D0*(TH*15.D0-180.D0-GLØNG-GH)
      CHI=CHI1-FNU
      CSZ=DSIN(RLAT)*SENI*DSIN(L)+DCØS(RLAT)*((DCØS(AI/2.D0)**2*DCØS(L-C
     1HI)+DSIN(AI/2.D0)**2*DCØS(L+CHI)))
      CST=DSIN(RLAT)*SENØM*DSIN(L1)+DCØS(RLAT)*(.9587251D0*DCØS(L1-CHI1
     1)+.0412749D0*DCØS(L1+CHI1))
      DMUN=2.6014433D-11+1.432503D-12*DCØS(SP)+7.8644D-14*DCØS(DSP)+2.00
     1919D-13*DCØS(SHP)+1.46007D-13*DCØS(DSH)
      DSUN=6.6889632D-14+1.118955D-15*DCØS(H-P1)
      RHØ=6.378388D+8*(1.D0-.003367D0*DSIN(RLAT)**2)
      PC1=5.886D+21*DMUN
      PC1=PC1*RHØ*DMUN
      PC1=PC1*DMUN
      PC2=8.829D+21*DMUN
      PC2=PC2*DMUN
      PC2=PC2*DMUN*RHØ
      PC2=PC2*DMUN*RHØ
      PC3=1.5952D+29*DSUN
      PC3=PC3*RHØ*DSUN
      PC3=PC3*DSUN
      CLS=PC1*(3.D0*CSZ**2-1.D0)+PC2*(5.D0*CSZ**3-3.D0*CSZ)+PC3*(3.D0*CS
     1T**2-1.D0)
      HØNK=  0.037D0*(3.0D0*DSIN(RLAT)**2-1.0)
      RETURN
      END
```

```
                           HEX     DEC                                  HEX     DEC                                  HEX     DEC
NAME   TYPE CLASS          LOC     WORDS       NAME   TYPE CLASS        LOC     WORDS       NAME   TYPE CLASS        LOC     WORDS
----   ---- -----        -------   -----       ----   ---- -----      -------   -----       ----   ---- -----      -------   -----
AI        C SCALR        0004E V       2       ARCOS     C SPROG      EXTERN                 ARSIN     D SPROG      EXTERN
CASOL     C SCALR        00056 V       2       CENT      C SCALR      000C6 V       2        CHI       D SCALR      0003A V       2
CHI1      C SCALR        0003C V       2       CLS       R SCALR     *00069 V   DUMMY        COSAL     D SCALR      00032 V       2
COSNE     C SCALR        0002C V       2       COSOM     C SCALR      00028 V       2        CST       D SCALR      00040 V       2
CSZ       C SCALR        0003E V       2       DABS      C SPROG      INTRIN                 DATAN2    D SPROG      INTRIN
DBIS      C UNUSED                             DCOS      C SPROG      INTRIN                 DE1       D SCALR      00034 V       2
DH        C SCALR        0000C V       2       DIBIS     C SCALR      0005A V       2        DID       D SCALR      00004 V       2
DIH       R SCALR        0005F V       1       DIY       C SCALR      00002 V       2        DMOD      D SPROG      INTRIN
DMUN      C SCALR        00042 V       2       DN        C SCALR      00012 V       2        DP        D SCALR      00010 V       2
DP1       C SCALR        00014 V       2       DS        C SCALR      00008 V       2        DSH       D SCALR      00022 V       2
DSIN      C SPROG        INTRIN                DSP       C SCALR      0001E V       2        DSUN      D SCALR      0004C V       2
DTD       C SCALR       *0006B V   DUMMY       DYM       C SCALR      00058 V       2        FLOAT     R SPROG      INTRIN
FNU       C SCALR        00052 V       2       GH        R SCALR      00060 V       1        GLONG     R SCALR      00061 V       1
H         C SCALR        0000E V       2       HONK      R SCALR     *0006A V   DUMMY        IBIS      I SCALR      0005E V       1
ID        I SCALR       *00066 V   DUMMY       IH        I SCALR     *00067 V   DUMMY        IM        I SCALR     *00068 V   DUMMY
INT       I SPROG        INTRIN                IY        I SCALR     *00065 V   DUMMY        L         D SCALR      00036 V       2
L1        C SCALR        00038 V       2       N         C SCALR      00054 V       2        OMEGA     D SCALR      0001A V       2
P         D SCALR        00018 V       2       PC1       C SCALR      00046 V       2        PC2       D SCALR      00048 V       2
PC3       D SCALR        0004A V       2       P1        C SCALR      00016 V       2        RHO       D SCALR      00044 V       2
RLAT      C SCALR       *00063 V   DUMMY       RLONG     C SCALR     *00064 V   DUMMY        S         D SCALR      0000A V       2
SENAL     D SCALR        00030 V       2       SENI      C SCALR      00050 V       2        SENNE     D SCALR      0002A V       2
SENNU     C SCALR        0002E V       2       SENOM     C SCALR      00026 V       2        SHP       D SCALR      00020 V       2
SP        C SCALR        0001C V       2       S1        C SCALR      00024 V       2        TH        R SCALR      00062 V       1
TIDAL     R SCALR        00000 V       1       TICAL       SPROG      00000 P                X         R SCALR      0005C V       1
X1        R SCALR        0005D V       1

LOCAL VARIABLES (59 WORDS)!

   00000 TIDAL       00002 DIY       00004 DID       00006 CENT      00008 DS       0000A S
   0000C DH          0000E H         00010 DP        00012 DN        00014 DP1      00016 P1
   00018 P           0001A OMEGA     0001C SP        0001E DSP       00020 SHP      00022 DSH
   00024 S1          00026 SENOM     00028 COSOM     0002A SENNE     0002C COSNE    0002E SENNU
   0003C SENAL       00032 COSAL     00034 DE1       00036 L         00038 L1       0003A CHI
   0003C CHI1        0003E CSZ       0004C CST       00042 DMUN      00044 RHO      00046 PC1
   00048 PC2         0004A PC3       0004C DSUN      0004E AI        00050 SENI     00052 FNU
   00054 N           00056 CASOL     00058 DYM       0005A DIBIS     0005C X        0005D X1
   0005E IBIS        0005F DIH       0006C GH        00061 GLONG     00062 TH

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 TICAL

INTRINSIC SUBPROGRAMS USED:

   DABS      DATAN2    DCOS      DMOD      DSIN      FLOAT     INT

EXTERNAL SUBPROGRAMS REQUIRED:

   ARCOS     ARSIN     9DATAN2   9DCOS     9DSIN     9CTOR     9ITOD     9ITOR
   9RTOI     9SETUPN
```

```
HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                    DEC         HEX
                   WORDS       WORDS
                   -----       -----
  GENERATED CODE:    450       001C2
       CONSTANTS:    116       00074
 LOCAL VARIABLES:     99       00063
           TEMPS:     22       00016
                   -----       -----
   TOTAL PROGRAM:    687       002AF
```

```
            SUBRØUTINE VETBY
          A( IDATA,IEØD,IIN,IIØUT,ITAPE,NUMPL,DATA,RLAT,RLØNG,KØGHM,IAGAP,LC
          ØT,RADEG,DEGRA,KDEG2,IDEG2,FDEG2,RDEG2,RTØP,ITØP,RBØT,IBØT,RLEFT,
          C ILEFT,RRIGT,IRIGT,SLTK,SLGK,SINCH,SMP,FBØT,FTØP,FLEFT,FRIGT,NDEG,
          C SLAT,SLØNG,BØTMP,XX,YY,INIT,XØLD,YØLD)
C
C          SUBRØUTINE VETBY,  TØ SET  CHART BØUNDARIES BY
C                             ØPERATØR ENTRY ØN CØNSØLE TTY
C
C    FØR NØN INTEGER CHART BØUNDARIES
C
C           CALLS SUBRØUTINE ARLIM
C
C
             CALL ARLIM(IIN,IIØUT,RTØP,RBØT,RLEFT,RRIGT)
             SMP=SINCH/60.0
           RDEG2=(RRIGT-RLEFT)
           FDEG2=RDEG2*RADEG
             RETURN
             END
```

```
                         HEX     DEC                                HEX     DEC                                HEX     DEC
NAME   TYPE CLASS        LØC     WØRDS     NAME   TYPE CLASS        LØC     WØRDS     NAME   TYPE CLASS        LØC     WØRDS
----   ---- -----     -------    -----     ----   ---- -----     -------    -----     ----   ---- -----     -------    -----
ARLIM       SPRØG     EXTERN               BØTMP       UNUSED*00026 V  DUMMY      DATA        UNUSED*00007 V  DUMMY
DEGRA       UNUSED*0000E V  DUMMY          FBØT        UNUSED*0001F V  DUMMY      FDEG2    R  SCALR *00011 V  DUMMY
FLEFT       UNUSED*00021 V  DUMMY          FRIGT       UNUSED*00022 V  DUMMY      FTØP        UNUSED*00020 V  DUMMY
IAGAP       UNUSED*0000B V  DUMMY          IBØT        UNUSED*00016 V  DUMMY      IDATA       UNUSED*00001 V  DUMMY
IDEG2       UNUSED*00010 V  DUMMY          IEØD        UNUSED*000C2 V  DUMMY      IIN      I  SCALR *00003 V  DUMMY
IIØLT    I  SCALR *00004 V  DUMMY          ILEFT       UNUSED*00018 V  DUMMY      INIT        UNUSED*00029 V  DUMMY
IRIGT       UNUSED*0001A V  DUMMY          ITAPE       UNUSED*000C5 V  DUMMY      ITØP        UNUSED*00014 V  DUMMY
KDEG2       UNUSED*0000F V  DUMMY          KØGHM       UNUSED*0000A V  DUMMY      LCNT        UNUSED*0000C V  DUMMY
NDEG        UNUSED*00023 V  DUMMY          NUMPL       UNUSED*000C6 V  DUMMY      RADEG    R  SCALR *0000D V  DUMMY
RBØT     R  SCALR *00015 V  DUMMY          RDEG2    R  SCALR *00012 V  DUMMY      RLAT        UNUSED*00008 V  DUMMY
RLEFT    R  SCALR *00017 V  DUMMY          RLØNG       UNUSED*00009 V  DUMMY      RRIGT    R  SCALR *00019 V  DUMMY
RTØP     R  SCALR *00013 V  DUMMY          SINCH    R  SCALR *0001D V  DUMMY      SLAT        UNUSED*00024 V  DUMMY
SLGK        UNUSED*0001C V  DUMMY          SLØNG       UNUSED*00025 V  DUMMY      SLTK        UNUSED*0001B V  DUMMY
SMP      R  SCALR *0001E V  DUMMY          VETBY       SPRØG  00000 P             VETBY    R  SCALR  00000 V      1
XØLD        UNUSED*0002A V  DUMMY          XX          UNUSED*00027 V  DUMMY      YØLD        UNUSED*0002B V  DUMMY
YY          UNUSED*00028 V  DUMMY

LØCAL VARIABLES (1 WØRD):

   00000 VETBY

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 VETBY

EXTERNAL SUBPRØGRAMS REQUIRED:

   ARLIM      9SETUPN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                     DEC      HEX
                    WØRDS    WØRDS
                    -----    -----
  GENERATED CØDE:     64     00040
       CØNSTANTS:      1     00001
 LØCAL VARIABLES:      1     00001
           TEMPS:     44     0002C
                    -----    -----
   TØTAL PRØGRAM:    110     0006E
```

```
      SUBRØUTINE WEIG2(XPØL,ZPØL,NVERT,X,NPTS,SUM,RHØ,TEST,DSU)
C    THIS IS VERSIØNS 2 WHICH ALSØ DØES WEIGHTEST
C     THIS SUBRØUTINE IS TØ BE USED  WITH TALPLØT.  IT CØMPUTES
C      THE DENSITY CØNTRIBUTIØN ØF A PØLYGØN ØF     DENSITY RHØ
C     AND ADDS THE CØNTRUIBUTIØN TØ THE SUM.
C      XPØL, ZPØL ARE THE CØØRDINATES ØF THE VERTICES ØF THE PØLYGØ
C      NVERT  IS THE # ØF VERTICES IN A PØLYGØN
C     X    IS THE CØØRDINATEE AT WHICH WE WISH THE SM CALCULATED.
C   NPTS IS THE # ØF PØINTS AT WHICH WE WISH THE SUM CALCULATED
C   SUM IS THE ACCUMULATED DENSITY CØNTRIBUTIØN
C     A RESTRICTIØN IS THAT THE FIRST THREE (3) PØINTS ØF A PØLYNØMIAL
C     MAY NØT HAVE THE SAME X CØØRDINATE.  .  THE FIRST TWØ(2) MAY
C     BE THE SAME, AND AFTER THE FIRST VERTICE ANY NUMBER MAY
C     THE DIMENSIØN ØF XPØL,ZPØL, MUST BE  3 GREATER IN THE MAIN
C    PRØGRAM THEN THE ACTUAL NØ ØF VERTICES (NVERT)
      DIMENSIØN XPØL(1),ZPØL(1),X(1),Z(1),WT(1),SUM(1),NFLAG(10),
     1DIS(10),SØRT(10) ,KFLAG(10) ,TEST(1) ,DSU(1)
      ZPØL(NVERT+1)=ZPØL(2)
      ZPØL(NVERT+2)=ZPØL(3)
      ZPØL(NVERT+3)=ZPØL(4)
      XPØL(NVERT+1)=XPØL(2)
      XPØL(NVERT+2)=XPØL(3)
      XPØL(NVERT+3)=XPØL(4)
      DØ 300 I=1,NPTS
      SU =0.
      INTER=1
      IIØUT=108
      NDUM=NVERT+2
      JJ=3
      XX=X(I)
      DØ 9 IG=1,10
      DIS(IG)=0.
9     NFLAG(IG)=-1 .
      IF(XX-XPØL(3)) 11,15,80
 15   JJ=2
      NDUM=NVERT+1
      IF(XX-XPØL(2)) 11,14,80
14    JJ=1
      NDUM=NVERT
      IF (XX-XPØL(1)) 11,17,80
17     CØNTINUE
      WRITE(IIØUT,18)
18    FØRMAT(' ********** FIRST 3 VERTICES HAVE .EQ. X CØØRD. '  )
 10   CØNTINUE
11    CØNTINUE
12    JJ=JJ+1
      IF(JJ.GT.NDUM ) GØ TØ 100
      IF (    XX-XPØL(JJ)) 11,20,21
20    JAC=JJ
22    IF (XX.NE.XPØL(JJ+1 )) GØ TØ 24
      JJ=JJ+1
      GØ TØ 22
21    DIS(INTER)=((XPØL(JJ)-XX)*ZPØL(JJ-1)+(XX-XPØL(JJ-1))*ZPØL(JJ))
     C/((XPØL(JJ)-XPØL(JJ-1)))
      INTER =INTER+1
      GØ TØ 80
C     THIS SECTIØN HANDLES INTERSECTIØN WITH A VERICAL
C     LINE ØR INTERSECTIØN THRU ØNE ØF THE VERTICES ØF THE PØLYGØN
24    IF(XPØL(JJ+1).GT.XX) GØ TØ 26
```

```
      IF (JJ.GE.NDUM  ) GØ TØ 100
      DIS(INTER)=(ZPØL(JJ)+ZPØL(JAC))/2.
      INTER=INTER+1
      GØ TØ 80
 26   IF (JAC.EG.JJ) GØ TØ 11
      DIS(INTER)=ZPØL(JAC)
      NFLAG(INTER)=INTER
      INTER=INTER+1
      DIS(INTER)       =ZPØL(JJ)
      NFLAG(INTER)=INTER-1
      INTER=INTER+1
      GØ TØ 11
 80   CØNTINUE
      JJ=JJ+1
      IF (JJ.GT.NDUM  ) GØ TØ 100
      IF (XPØL(JJ)-XX) 80,90,91
 90   JAC=JJ
 92   IF (XX.NE.XPØL(JJ+1) ) GØ TØ 94
      JJ=JJ+1
      GØ TØ 92
 91   DIS(INTER)=((XX-XPØL(JJ))*ZPØL(JJ-1)+(XPØL(JJ-1)-XX)*ZPØL(JJ))
     1/(XPØL(JJ-1)-XPØL(JJ))
      INTER =INTER+1
      GØ TØ 11
 94   IF (  XPØL(JJ+1).LT.XX) GØ TØ 96
      DIS(INTER)=(ZPØL(JJ)+ZPØL(JAC))/2.
      INTER=INTER+1
      GØ TØ 11
 96   IF(JAC.EG.JJ) GØ TØ 80
      DIS(INTER)=ZPØL(JAC)
      NFLAG(INTER)=INTER
      INTER=INTER+1
      DIS(INTER)=ZPØL(JJ)
      NFLAG(INTER)=INTER-1
      INTER=INTER+1
      GØ TØ 80
 100  CØNTINUE
C     WRITE (108,517)
  517 FØRMAT('DIS   (NFLAG')
C
C
C
C     WE HAVE NØW LØCZTED ALL THE INTERSECTIØNS WHICH RUN DØWN THE
C     BØDY ØF A PØLYGØN AND NEVER CRØSSES IN ØR ØUT
C     THE INTERSECTIØN WILL   NØW BE SØRTED FRØM SMALLEST TØ LARGEST
      INTER=INTER-1
C     THIS CHANGES INTER  SØ THAT IT NØW = THE # ØF INTERSECTIØNS
      IF(INTER.EG.0) GØ TØ 300
C  IF THERE ARE NØ INTERSECTINS WE BYPASS THE CØPUTATIØN
C   ØF THE SDISTANCE
C    SØRT FRØM SMALLEST TØ LARGESR
      DØ 112 IU=1,INTER
      JJU=1
      KFLAG(IU)=NFLAG(1)
      SØRT(IU)=DIS(1)
      DØ 110 JU=2,INTER
      IF(SØRT(IU).LE.DIS(JU)) GØ TØ 110
      SØRT(IU)=DIS(JU)
      KFLAG(IU)=NFLAG(JU)
      JJU=JU
      110 CONTINUE
          DIS(JUL)=1.E70
      112 CONTINUE
          SUBT=0.
          IF(SORT(1)) 2201,2202,2202
     2201 CONTINUE
          DSOR=0.
          IF(SORT(2).LT.0) DSOR=SORT(2)
          SUBT=(SORT(1)-DSOR)
     2202 CONTINUE
C         WRITE (108,52) INTER
C         WRITE (108,518),(SORT(IX),KFLAG(IX),IX=1,4)
       52 FORMAT (1X,I3)
      518  FORMAT(1X,F6.3,1X,I3)
C         THE NO ARE ALL SORTED NOW
C         WE ARE NOW GOING TO COMPLTE THE SI DISTANCE
C
          MDID=0
      201 IF(INTER-MDID) 999,999,202
      202 MDID=MDID+1
          IF(KFLAG(MDID)) 203,203,221
      203 SU     =SU     +SORT(MDID+1)-SORT(MDID)
          IF (    KFLAG(MDID+1))204,204,245
      204 MDID=MDID+1
          GO TO 201
C     THIS HAS NOW HANDLED THE NORMAN SECTION
      221 IF (  KFLAG(MDID).NE.KFLAG(MDID+1)) GO TO 224
          SU     =SU     +(SORT(MDID+1)-SORT(MDID))/2.
          MDID=MDID+1
          GO TO 201
      224 SU     =SU     +(SORT(MDID+3)+SORT(MDID+2)-SORT(MDID+1)-SORT(MDID))
         C/2.
          MDID=MDID+3
          GO TO 201
      245 IF(  KFLAG(MDID+1).NE.KFLAG(MDID+2)) GO TO 248
          SU     =SU     +(SORT(MDID+2)-SORT(MDID+1))      /2.
          MDID=MDID+2
          GO TO 203
      248 SU     =SU     +(SORT(MDID+2)-SORT(MDID+1)+SORT(MDID+4)-SORT(MDID+3)
         8)/2.
          MDID=MDID+4
          GO TO 203
      999 SUM(I)=SUM(I)+RHO*SU     *100.
          TEST(I)=TEST(I)+(SU+SUBT)*267.
          DSU(I)=SU*RHO*100.
      300 CONTINUE
          RETURN
          END
```

```
                         HEX      DEC                               HEX      DEC                               HEX      DEC
NAME   TYPE CLASS        LOC      WORDS     NAME   TYPE CLASS        LOC      WORDS     NAME   TYPE CLASS        LOC      WORDS
----   ---- -----      -------    -----     ----   ---- -----      -------    -----     ----   ---- -----      -------    -----
DIS       R ARRAY      0000D V       10     DSOR      R SCALR      00038 V        1     DSU       R ARRAY     *00042 V    DUMMY
I         I SCALR      0002B V        1     IIOUT     I SCALR      0002E V        1     INTER     I SCALR      0002D V        1
IG        I SCALR      00032 V        1     IU        I SCALR      00034 V        1     JAC       I SCALR      00033 V        1
JJ        I SCALR      00030 V        1     JJU       I SCALR      00035 V        1     JU        I SCALR      00036 V        1
KFLAG     I ARRAY      00021 V       10     MDID      I SCALR      00039 V        1     NDUM      I SCALR      0002F V        1
NFLAG     I ARRAY      00003 V       10     NPTS      I SCALR     *0003E V    DUMMY     NVERT     I SCALR     *0003C V    DUMMY
RHO       R SCALR     *00040 V    DUMMY     SORT      R ARRAY      00017 V       10     SU        R SCALR      0002C V        1
SUBT      R SCALR      00037 V        1     SUM       R ARRAY     *0003F V    DUMMY     TEST      R ARRAY     *00041 V    DUMMY
WEIG2       SPROG      00000 P              WEIG2     R SCALR      00000 V        1     WT        R ARRAY      00002 V        1
X         R ARRAY     *0003D V    DUMMY     XPOL      R ARRAY     *0003A V    DUMMY     XX        R SCALR      00031 V        1
Z         R ARRAY      00001 V        1     ZPOL      R ARRAY     *0003B V    DUMMY

        HEX               HEX               HEX               HEX               HEX               HEX
LABEL   LOC       LABEL   LOC       LABEL   LOC       LABEL   LOC       LABEL   LOC       LABEL   LOC
-----   -----     -----   -----     -----   -----     -----   -----     -----   -----     -----   -----
    9   00044        10   00072        11   00072        12   00072        14   00057        15   0004D
   17   00060        18   00064        20   0007B        21   00084        22   0007D        24   00098
   26   000A9        52   0013F        80   000BE        90   000C7        91   000D0        92   000C9
   94   000E6        96   000F4       100   00109       110   00124       112   0012E       201   00149
  202   0014C       203   00150       204   00158       221   0015A       224   00165       245   0016F
  248   0017A       300   00193       517   00109       518   00142       999   00184      2201   00136
 2202   0013F

LOCAL VARIABLES (58 WORDS):

   00000 WEIG2      00001 Z          00002 WT         00003 NFLAG      0000D DIS        00017 SORT
   00021 KFLAG      0002B I          0002C SU         0002D INTER      0002E IIOUT      0002F NDUM
   00030 JJ         00031 XX         00032 IG         00033 JAC        00034 IU         00035 JJU
   00036 JU         00037 SUBT       00038 DSOR       00039 MDID

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 WEIG2

EXTERNAL SUBPROGRAMS REQUIRED:

   F:102      F:104      F:106      F:108      9BCDWRIT   9ENDIOL    9SETUPN

HIGHEST ERROR SEVERITY: 0 (NO ERRORS)

                      DEC       HEX
                     WORDS     WORDS
                     -----     -----
  GENERATED CODE:      409     00199
       CONSTANTS:        4     00004
 LOCAL VARIABLES:       58     0003A
           TEMPS:       12     0000C
                     -----     -----
   TOTAL PROGRAM:      483     001E3
```

```
C     SUBROUTINE YBLKI          BLOCKED TAPE INPUT SEIS FORMAT
C      MODIFIED MAY 13,1971 BY REMOVING RECORD SKIP AFTER BAD READ (FOR
C      NEW MONITOR)
C  MODIFIED  TO YBLKI FROM GBLKI MARCH 25,1971 BY FOLINSBEE
C      PROGRAMMER J WEBSTER                                             GBLI   1
C      FOR C BOWIN                                                      GBLI   2
C      NOV 1970                                                         GBLI   3
C                                                                       GBLI   4
C***********************************************************************GBLI   5
C    SUBROUTINE HAS TWO ENTRY POINTS, YSETI, AND YBLKI
C      YSETI IS THE INITIALIZING ENTRY, YBLKI IS THE NORMAL ENTRY       GBLI
C      SUBROUTINE READS BLOCKED RECORDS FROM A MAG TAPE,                GBLI   8
C      AND RETURNS DATA FROM ONE LOGICAL RECORD,                        GBLI   9
C      CONVERTED ACCORDING TO A SPECIFIED FORMAT                        GBLI  10
C***********************************************************************GBLI  11
       SUBROUTINE YBLKI(
     1 ISR1,ISR2,KDA,KMO,KYR,KHM,ISEC,ILAT,KSN,ILON,KWE,IDEPT,IAMAG,IMB,
     2 ISOS,INTS,IDIAS,ITSU,ISEICH,IVOLC,INONT,IWG,IFEG,IMS,IASP,IZH,
     3 ICE,IMG,IAUTH,IGHY,NPF,IOQ,ILM,IS1,IS2
     4 )
C                                                                       GBLI  15
C      ALL YBLKI ARGUMENTS ARE VARIABLE NAMES FOR DATA
C      TO BE READ FROM 1 LOGICAL RECORD                                 GBLI  17
       GO TO 100                                                        GBLI  18
C                                                                       GBLI  19
C***********************************************************************GBLI  20
       ENTRY YSETI(ITAPE,IFMT,INDIC,IBLFC,IRLEN,IBUF)
        DIMENSION IBUF(1)
C                                                                       GBLI  22
C      THIS IS THE INITIALIZING ENTRY                                   GBLI  23
C      ITAPE IS LOGICAL UNIT NUMBER FOR INPUT                           GBLI  24
C      IFMT IS STATEMENT NO. OF FORMAT                                  GBLI  25
C      INDIC IS INDICATOR OF INPUT STATUS                               GBLI  26
C         1=READ OKAY                                                   GBLI  27
C         2=END OF FILE                                                 GBLI  28
C         4=PARITY ERROR                                                GBLI  29
C         5=FORMAT ERROR                                                GBLI  30
C         6=BOTH 4 AND 5 TYPE ERRORS FOUND                              GBLI  31
C                                                                       GBLI  32
C      IBLFC IS BLOCKING FACTOR (NO OF LOGICAL RECORDS PER BLOCK)       GBLI  33
C      IRLEN IS LOGICAL RECORD LENGTH (MUST BE MULTIPLE OF 4)           GBLI  34
C      IBUF IS INPUT BUFFER                                             GBLI  35
C      IF IBLFC AND IRLEN ARE CHANGED, THE SIZE OF ARRAY IBUF           GBLI  36
C      MUST ALSO BE CHANGED TO IBLFC*IRLEN/4                            GBLI  37
       IWORD=IRLEN/4                                                    GBLI  41
       IBLSZ=IBLFC*IWORD                                                GBLI  42
       ICNT=0                                                           GBLI  43
       RETURN                                                           GBLI  44
C      END OF INITIALIZING PART OF SUBROUTINE                           GBLI  45
C                                                                       GBLI  46
C***********************************************************************GBLI  47
C      SET UP RUN-TIME ABORT FOR FORMAT ERRORS                          GBLI  48
  100  CALL ABORTSET(220S,6)                                            GBLI  49
        IF(INDIC.EQ.6) INDIC=4
        IF(INDIC.EQ.5) INDIC=1
       ITOTR=IBLFC                                                      GBLI  50
C                                                                       GBLI  51
C      TEST WHETHER BLOCK IS TO BE READ FROM TAPE                       GBLI  52
       IF(ICNT.NE.0) GO TO 125                                          GBLI  53
```

```
      C                                                                   GBLI 54
      C     YES,READ PHYSICAL RECØRD                                      GBLI 55
            CALL BUFFERIN(ITAPE,0,IBUF,IBLSZ,IND,NW)                      GBLI 56
       110  GØ TØ (110,120,200,210),IND                                   GBLI 57
       120  INDIC=1                                                       GBLI 58
       125  IF(NW.NE.IBLSZ) ITØTR=NW/IRLEN
           *;WRITE(108,501) NW
      501    FØRMAT('YBLKI: ABNØRMAL REC LENGTH, NW=',I10   )
      126    CØNTINUE
            J=ICNT*IWØRD+1                                                GBLI 60
      C                                                                   GBLI 61
      C     DECØDE LØGICAL RECØRD ACCØRDING TØ FØRMAT STATEMENT           GBLI 62
            DECØDE(IRLEN,IFMT,IBUF(J))                                    GBLI 63
           1 ISR1,ISR2,KDA,KMØ,KYR,KHM,ISEC,ILAT,KSN,ILØN,KWE,IDEPT,IAMAG,IMB,
           2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG;IFEG,IMS,IASP,IZH,
           3 ICE,IMG,IALTH,IGHY,NPP,IØG,ILM,IS1,IS2
      C                                                                   GBLI 67
      C     KEEP TRACK ØF NØ. ØF LØGICAL RECØRDS                          GBLI 68
      130    CØNTINUE
            ICNT=ICNT+1                                                   GBLI 69
            IF(ICNT.GE.ITØTR) ICNT=0                                      GBLI 70
             CALL ABØRTSET(0)
            RETURN                                                        GBLI 72
      C                                                                   GBLI 73
      C     CØNTRØL TRANSFERS HERE FØR EØF                                GBLI 74
       200  INDIC=2                                                       GBLI 75
            GØ TØ 130                                                     GBLI 76
      C                                                                   GBLI 77
      C     CØNTRØL CØMES HERE FØR READ ERRØR                             GBLI 78
       210  INDIC=4                                                       GBLI 79
             ØUTPUT 'YBLKI READ ERRØR'
      C
      C    RESET NW (CØMPENSATING FØR BUFFIN ERRØR)
             NW=IBLKSZ
      C
             GØ TØ 126
      C                                                                   GBLI 81
      C     CØNTRØL CØMES HERE FØR FØRMAT ERRØR                           GBLI 82
      220    CØNTINUE
            IF(INDIC.EQ.4) INDIC=6;GØ TØ 130
            INDIC=5                                                       GBLI 84
            GØ TØ 130                                                     GBLI 85
            END                                                           GBLI 86
```

```
                        HEX     DEC                               HEX     DEC                                HEX     DEC
NAME      TYPE CLASS    LØC     WØRDS     NAME      TYPE CLASS    LØC     WØRDS     NAME      TYPE CLASS     LØC     WØRDS
----      ---- -----  -------   -----     ----      ---- -----  -------   -----     ----      ---- -----   -------   -----
ABØRTSET       SPRØG   EXTERN             BUFFERIN       SPRØG   EXTERN             IAMAG        I SCALR  *00015 V DUMMY
IASP         I SCALR  *00021 V DUMMY      IALTH        I SCALR  *00025 V DUMMY      IBLFC        I SCALR  *0002F V DUMMY
IBLKSZ       I SCALR   00008 V     1      IBLSZ        I SCALR   00002 V     1      IBUF         I ARRAY  *00031 V DUMMY
ICE          I SCALR  *00023 V DUMMY      ICNT         I SCALR   00003 V     1      IDEPT        I SCALR  *00014 V DUMMY
IDIAS        I SCALR  *00019 V DUMMY      IFEG         I SCALR  *0001F V DUMMY      IFMT         I SCALR  *0002D V DUMMY
ILAT         I SCALR  *0001C V DUMMY      ILM          I SCALR  *00029 V DUMMY      ILØN         I SCALR  *00012 V DUMMY
IMB          I SCALR  *00016 V DUMMY      IMG          I SCALR  *00024 V DUMMY      IMS          I SCALR  *00020 V DUMMY
IND          I SCALR   00005 V     1      INDIC        I SCALR  *0002E V DUMMY      INØNT        I SCALR  *0001D V DUMMY
INTS         I SCALR  *00018 V DUMMY      IØC          I SCALR  *00028 V DUMMY      IQHY         I SCALR  *00026 V DUMMY
IRLEN        I SCALR  *00030 V DUMMY      ISEC         I SCALR  *0000F V DUMMY      ISEICH       I SCALR  *0001B V DUMMY
ISØS         I SCALR  *00017 V DUMMY      ISR1         I SCALR  *00009 V DUMMY      ISR2         I SCALR  *0000A V DUMMY
IS1          I SCALR  *0002A V DUMMY      IS2          I SCALR  *0002B V DUMMY      ITAPE        I SCALR  *0002C V DUMMY
ITØTR        I SCALR   00004 V     1      ITSW         I SCALR  *0001A V DUMMY      IVØLC        I SCALR  *0001C V DUMMY
IWG          I SCALR  *0001E V DUMMY      IWØRD        I SCALR   00001 V     1      IZH          I SCALR  *00022 V DUMMY
W            I SCALR   00007 V     1      KDA          I SCALR  *0000B V DUMMY      KHM          I SCALR  *0000E V DUMMY
KMØ          I SCALR  *0000C V DUMMY      KSN          I SCALR  *00011 V DUMMY      KWE          I SCALR  *00013 V DUMMY
KYR          I SCALR  *0000D V DUMMY      NPP          I SCALR  *00027 V DUMMY      NW           I SCALR   00006 V     1
YBLKI        R SCALR   00000 V     1      YBLKI          SPRØG   00000 P            YSETI          SPRØG   00028 P

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC      LABEL   LØC
-----  -----     -----  -----     -----  -----     -----  -----     -----  -----     -----  -----
  100  00038       110  00058       120  00061       125  00063       126  00078       130  000A6
  200  000BC       210  00083       220  000C2       501  0006D

LØCAL VARIABLES (9 WØRDS):

   00000 YBLKI      00001 IWØRD      00002 IBLSZ      00003 ICNT       00004 ITØTR      00005 IND
   00006 NW         00007 W          00008 IBLKSZ

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 YBLKI      00028 YSETI

EXTERNAL SUBPRØGRAMS REQUIRED:

   ABØRTSET   BUFFERIN   F:108      9ASFØRM    9DECØDE    SENDIØL    9IØDATA    9PRINT
   9SETUFN
```

```
HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                         DEC        HEX
                        WØRDS      WØRDS
                        -----      -----
   GENERATED CØDE:       204       000CC
        CØNSTANTS:         3       00003
  LØCAL VARIABLES:         9       00009
            TEMPS:        43       0002B
                        -----      -----
    TØTAL PRØGRAM:       259       00103
```

```
C     SUBRØUTINE YBLKØ - BLØCKED TAPE ØUTPUT
C       VERSIØN ØF APRIL 11,72 TØ ØUTPUT LAT AND LØNG KEY AT END
C   ØF RECØRD
C  MØD ØF AUG 16,71 TØ  ØUTPUT SHØRT RECØRD WHEN YENDØ CALLED
C   MØDIFIED FRØM GBLKØ ØN MAR 25 71 BY  AFØLINSBEE TØ ØUTPUT SEIS DATA
C  .  PRØGRAMMER J WEBSTER                                                GBLØ
C     FØR C BØWIN                                                         GBLØ  2
C     NØV 1970                                                            GBLØ  3
C                                                                         GBLØ
C*************************************************************************GBLØ
C     SUBRØUTINE HAS 3 ENTRY PØINTS: YSETØ, YBLKØ, YENDØ
C     YSETØ IS THE INTIALIZING ENTRY
C     YBLKØ IS THE NØRMAL ENTRY
C     YENDØ IS THE TERMINATING ENTRY
C*************************************************************************GBL  10
       SUBRØUTINE YBLKØ(
     1 ISR1,ISR2,KDA,KMØ,KYR,KHM,ISEC,ILAT,KSN,ILØN,KWE,IDEPT,IAMAG,IMB,
     2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
     3 ICE,IMG,IALTH,IGHY,NPF,IØG,ILM,IS1,IS2
     4 )
C      ALL YBLKØ ARGUMENTS ATE VARIABLE NAMES FØR DATA
C     TØ BE WRITTEN IN 1 LØGICAL RECØRD                                   GBLØ 15
       DATA JNN/1HN/
       DATA JEE/1HE/
      GØ TØ 300                                                           GBLØ 16
C*************************************************************************GBLØ 17
       ENTRY YSETØ(JTAPE,JFMT,NDPS,JFULL,JBLFC,JRLEN,MAXBL,JBUF)
       DIMENSIØN JBUF(1)
C                                                                         GBLØ 19
C     THIS IS THE INITIALIZING ENTRY                                      GBLØ 20
C     JTAPE IS THE LØGICAL UNIT NUMBER FØR ØUTPUT                         GBLØ 21
C     JFMT IS STATEMENT NØ. ØF FØRMAT                                     GBLØ 22
C     NDPS IS THE NØ. ØF DATA PØINTS CURRENTLY WRITTEN ØN A TAPE          GBLØ 23
C     JFULL IS STATEMENT NØ. TØ WHICH CØNTRØL IS TRANSFERRED              GBLØ 24
C           WHEN ØUTPUT TAPE IS FULL                                      GBLØ 25
C                                                                         GBLØ 26
C                                                                         GBLØ 27
C     JBLFC IS BLØCKING FACTØR (NØ. ØF LØGICAL RECØRDS PER BLØCK)         GBLØ 28
C     JRLEN IS LØGICAL RECØRD LENGTH (MUST BE MULTIPLE ØF 4)              GBLØ 29
C     JBUF IS ØUTPUT BUFFER                                               GBLØ 30
C     IF JBLFC AND JRLEN ARE CHANGED, THE SIZE ØF ARRAY JBUF              GBLØ 31
C             MUST BE CHANGED TØ JBLFC*JRLEN/4                            GBLØ 32
      IIØUT=108                                                           GBLØ 36
C                                                                         GBLØ 37
C     MAXBL IS MAXIMUM NØ. ØF BLØCKS PER TAPE                             GBLØ 38
C                                                                         GBLØ 40
C     JBLK CØUNTS BLØCKS                                                  GBLØ 41
      JBLK=0                                                              GBLØ 42
C                                                                         GBLØ 43
C     ZERØ ØUT DATA PØINT CØUNTER                                         GBLØ 44
      NDPS=0                                                              GBLØ 45
C     JCNT CØUNTS LØGICAL RECØRDS WITHIN A BLØCK                          GBLØ 46
      JCNT=0                                                              GBLØ 47
      JWØRD=JRLEN/4                                                       GBLØ 48
      JBLSZ=JBLFC*JWØRD                                                   GBLØ 49
      RETURN                                                              GBLØ 50
C                                                                         GBLØ 51
C     END ØF INITIALIZATIØN                                               GBLØ 52
C*************************************************************************GBLØ 53
```

```
C     THIS IS THE TERMINATING ENTRY POINT                                      GBLØ 54
       ENTRY YENDØ
C                                                                              GBLØ 57
      IF(JCNT.EQ.0) GØ TØ 400
C   SETTING UP TØ ØUTPUT SHØRT RECØRD
      JBLSZ=JWØRD*JCNT
      GØ TØ 310                                                                GBLØ 62
C***********************************************************************GBLØ 63
C                                                                              GBLØ 64
C     CØNVERT LØGICAL RECØRD TØ BCD                                            GBLØ 65
  300 I=JCNT*JWØRD+1                                                           GBLØ 66
       TKEY=ILAT/1000
       GKEY=ILØN/1000
       IF(KSN.NE.JNN) TKEY=-TKEY
       IF(KWE.NE.JEE) GKEY=-GKEY
       LTKEY=TKEY+90.
       LGKEY=GKEY+180.
      ENCØDE(JRLEN,JFMT,JBUF(I))                                               GBLØ 67
     1 ISR1,ISR2,KDA,KMØ,KYR,KHM,ISEC,ILAT,KSN,ILØN,KWE,IDEPT,IAMAG,IMB,
     2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,IMØNT,IWG,IFEG,IMS,IASP,IZH,
     3 ICE,IMG,IAUTH,IGHY,NPF,IØG,ILM,IS1,IS2 ,LTKEY,LGKEY
      JCNT=JCNT+1                                                              GBLØ 71
C                                                                              GBLØ 72
C     TEST IF READY TØ WRITE BLØCK TØ TAPE                                     GBLØ 73
      IF(JCNT.LT.JBLFC) GØ TØ 400                                              GBLØ 74
C                                                                              GBLØ 75
C     WRITE BLØCK ØNTØ TAPE                                                    GBLØ 76
  310 CALL BUFFER ØUT (JTAPE,0,JBUF,JBLSZ,IND)                                 GBLØ 77
       JBLSZ=JBLFC*JWØRD
  320 GØ TØ (320,350,330,330),IND                                              GBLØ 78
  330 WRITE(IIØUT,340) JBLK
  340 FØRMAT(' ERRØR IN WRITING TAPE AFTER',I6, ' BLØCKS')                     GBLØ 80
      CALL EXIT                                                                GBLØ 81
C                                                                              GBLØ 82
C     INCREMENT AND RESET CØUNTERS                                             GBLØ 83
  350 CØNTINUE                                                                 GBLØ 84
      NDFS=NDFS+JCNT                                                           GBLØ 85
      JCNT=0                                                                   GBLØ 86
      JBLK=JBLK+1                                                              GBLØ 87
C                                                                              GBLØ 88
C     TEST IF TAPE IS FULL                                                     GBLØ 89
      IF(JBLK.LE.MAXBL) GØ TØ 400                                              GBLØ 90
      JBLK=0                                                                   GBLØ 91
      NDFS=0                                                                   GBLØ 92
      WRITE(IIØUT,360)                                                         GBLØ 93
  360 FØRMAT(' MAXBL ØUTPUT')                                                  GBLØ 94
      RETURN JFULL                                                             GBLØ 95
  400 RETURN                                                                   GBLØ 96
      END                                                                      GBLØ 97
```

```
                            HEX    DEC                                   HEX    DEC                                   HEX    DEC
NAME      TYPE CLASS        LOC    WORDS     NAME    TYPE CLASS          LOC    WORDS     NAME    TYPE CLASS          LOC    WORDS
----      ---- -----      -------  -----     ----    ---- -----        -------  -----     ----    ---- -----        -------  -----
BUFFEROL       SPROG      EXTERN             EXIT         SPROG        EXTERN             GKEY       R SCALR       0000A V      1
I            I SCALR      00008 V      1     IAMAG      I SCALR       *0001A V DUMMY      IASP       I SCALR      *00026 V DUMMY
IAUTH        I SCALR     *0002A V DUMMY      ICE        I SCALR       *00028 V DUMMY      IDEPT      I SCALR      *00019 V DUMMY
IDIAS        I SCALR     *0001E V DUMMY      IFEG       I SCALR       *00024 V DUMMY      IIOUT      I SCALR       00003 V      1
ILAT         I SCALR     *00015 V DUMMY      ILM        I SCALR       *0002E V DUMMY      ILON       I SCALR      *00017 V DUMMY
IMB          I SCALR     *0001B V DUMMY      IMG        I SCALR       *00029 V DUMMY      IMS        I SCALR      *00025 V DUMMY
IND          I SCALR      0000D V      1     INONT      I SCALR       *00022 V DUMMY      INTS       I SCALR      *0001D V DUMMY
IOG          I SCALR     *0002D V DUMMY      IGHY       I SCALR       *0002B V DUMMY      ISEC       I SCALR      *00014 V DUMMY
ISEICH       I SCALR     *0002C V DUMMY      ISOS       I SCALR       *0001C V DUMMY      ISR1       I SCALR      *0000E V DUMMY
ISR2         I SCALR     *0000F V DUMMY      IS1        I SCALR       *0002F V DUMMY      IS2        I SCALR      *00030 V DUMMY
ITSL         I SCALR     *0001F V DUMMY      IVOLC      I SCALR       *00021 V DUMMY      IWG        I SCALR      *00023 V DUMMY
IZH          I SCALR     *00027 V DUMMY      JBLFC      I SCALR       *00035 V DUMMY      JBLK       I SCALR       00004 V      1
JBLSZ        I SCALR      00007 V      1     JBUF       I ARRAY       *00038 V DUMMY      JCNT       I SCALR       00005 V      1
JEE          I SCALR      00002 V      1     JFMT       I SCALR       *00032 V DUMMY      JFULL      I SCALR      *00034 V DUMMY
JNN          I SCALR      00001 V      1     JRLEN      I SCALR       *00036 V DUMMY      JTAPE      I SCALR      *00031 V DUMMY
JWORD        I SCALR      00006 V      1     KDA        I SCALR       *00010 V DUMMY      KHM        I SCALR      *00013 V DUMMY
KMO          I SCALR     *00011 V DUMMY      KSN        I SCALR       *00016 V DUMMY      KWE        I SCALR      *00018 V DUMMY
KYR          I SCALR     *00012 V DUMMY      LGKEY      I SCALR        0000C V      1     LTKEY      I SCALR       0000B V      1
MAXBL        I SCALR     *00037 V DUMMY      NDPS       I SCALR       *00033 V DUMMY      NPP        I SCALR      *0002C V DUMMY
TKEY         R SCALR      00009 V      1     YBLKO        SPROG        000C0 P            YBLKO      R SCALR       00000 V      1
YENDO          SPROG      00044 F            YSETO        SPROG        00028 P

        HEX              HEX              HEX              HEX              HEX              HEX
LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC      LABEL   LOC
-----   -----    -----   -----    -----   -----    -----   -----    -----   -----    -----   -----
  300   0004C      310   0009C      320   000A9      330   000B2      340   000B7      350   000C6
  360   000D6      400   000DE

LOCAL VARIABLES (14 WORDS):

   00000 YBLKO      00001 JNN        00002 JEE        00003 IIOUT      00004 JBLK       00005 JCNT
   00006 JWORD      00007 JBLSZ      00008 I          00009 TKEY       0000A GKEY       0000B LTKEY
   0000C LGKEY      0000D IND

BLANK COMMON (0 WORDS)

ENTRY POINTS:

   00000 YBLKO      00028 YSETO      00044 YENDO

EXTERNAL SUBPROGRAMS REQUIRED:

   BUFFEROU   EXIT       F:102      F:104      F:106      F:108      9ASFORM    9ASGOTO
   9BCDWRIT   9ENCODE    9ENDIOL    9IODATA    9ITOR      9RTOI      9SET[illegible]N  [illegible]TUP
```

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                      ---


HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                      DEC       HEX
                     WØRDS     WØRDS
                     -----     -----
  GENERATED CØDE:     223      000DF
       CØNSTANTS:       5      00005
 LØCAL VARIABLES:      14      0000E
           TEMPS:      45      0002D
                     -----     -----
   TØTAL PRØGRAM:     287      0011F
```

```
            SUBRØUTINE YINØT(ITAPE,JTAPE,KK,
          1 ISR1,ISR2,KDA,KMØ,KYR,KHM,SEC,CLAT,KSN,CLØN,KWE,DEPT,AMAG,IMB,
          2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
          3 ICE,IMG,IAUTH,IGHY,NPP,IØQ,ILM,IS1,IS2
          4 )
     C                         FØR INPUT AND ØUTPUT ØF SEISMICITY DATA USC&GS
     C
     C        VERSIØN 24 FEB 1975 TØ ADD HANDLING ØF PRØJ4 ØUTPUT
     C            VERSIØN ØF 25 AUGUST 1972, TØ UPDATE DECK TØ BE LIKE
     C                 VERSIØN ØF 8 MARCH 1972 CØMPILED BY FØLINSBEE
     C
     C  VERSIØN ØF APRIL 2 71 TØ CØRRECT FØRMAT ERRØRS
     C   VERSIØN ØF MARCH 25 1971 BY A FØLINSBEE TØ INCØRPERATE
     C       FACILITY TØ READ AND WRITE BLØCKED DATA
     C    SSW(44) = 1  FØR BLØCKED INPUT
     C   SN AND WE  WERE MASDE  INTØ INTEGER S FØR CØMPATIBLITY WITH THE SIG-7
     C   USAGE ØF ALPHA NUMERICS
     C   NFILE ØPTIØN NØT IMPLEMENTED FØR THIS PRØGRAM
            DIMENSIØN IBUF(400),JBUF(200)
           DATA IFLAG/0/
            IF(KK)420,400,410
      400   IIN = 105
            IIØUT = 108
            IPUN=106
            ØUTPUT 'SUBRØUTINE YINØT, VERSIØN ØF 24 FEB 1975'
            NZERØ=0
             KGDAØ=NZERØ
             KGMØØ=NZERØ
             KGYRØ=NZERØ
             KGHMØ=NZERØ
           JRLEN=IRLEN=88
           JBLFC=IBLFC=10
            NREC=0
            MXCT= 34000
            IF(ISW(45).NE.0) MXCT= 15000
            IF(ISW(44).NE.0) CALL YSETI(ITAPE,65S,INDIC,IBLFC,IRLEN,IBUF)
            IF( ISW(45).NE.0) CALL YSETØ(JTAPE,65S,NDPS,88S  ,JBLFC,JRLEN
          * ,MXCT,
          *  JBUF)
            GØ TØ 500
      410   CØNTINUE
            IF(ISW(44).NE.0) GØ TØ 600
           READ(ITAPE,65)
          1 ISR1,ISR2,KDA,KMØ,KYR,KHM,ISEC,ILAT,KSN,ILØN,KWE,IDEPT,IAMAG,IMB,
          2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
          3 ICE,IMG,IAUTH,IGHY,NPP,IØQ,ILM,IS1,IS2
            CALL STAT(I)
     411    CØNTINUE
             IF (ISR1.EQ.800) KK = 8 ;  RETURN
            SEC=ISEC/10.
            CLAT=ILAT/1000.
            CLØN=ILØN/1000.
            DEPT=IDEPT
            AMAG=IAMAG/100.
            CALL EVIL(IIØUT,I,IBAD,KGDAØ,KGMØØ,KGYRØ,KGHMØ)
            IF(IBAD)410,53,74
     C      END ØF INPUT DATA, REQUIRED NØ. ØF FILES NØW PRØCESSED
     74    CØNTINUE
     577    CØNTINUE
```

```
      KK=9
       GØ TØ 500
 53   CØNTINUE
       KGDAØ=KDA
       KGMØØ=KMØ
       KGYRØ=KYR
       KGHMØ=KHM+SEC/60.+.49
       GØ TØ 500
 420  CØNTINUE
      IFLAG=1
        ISEC=SEC*10.     +.49
       ILAT=CLAT*1000.  +.49
       ILØN=CLØN*1000.  +.49
       IDEPT=DEPT       +.49
       IAMAG=AMAG*100.  +.49
       IF(ISW(45).NE.0) GØ TØ 700
       IF(ISW(26).EQ.1) JTAPE=108
C      CALCULATING LATITUDE AND LØNGITUDE KEY
       TKEY=CLAT
       GKEY=CLØN
       IF(KSN.NE.JNN) TKEY=-TKEY
       IF(KWE.NE.JEE) GKEY=-GKEY
       LTKEY=TKEY+90.
       LGKEY=GKEY+180.
      WRITE(JTAPE,65)
     1 ISR1,ISR2,KDA,KMØ,KYR,KHM,ISEC,ILAT,KSN,ILØN,KWE,IDEPT,IAMAG,IMB,
     2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
     3 ICE,IMG,IAUTH,IGHY,NPP,IØG,ILM,IS1,IS2 ,LTKEY , LGKEY
 65    FØRMAT(2A3,3I2,I4,I3,I5,A1,I6 ,A1,2I3,A2,A3,7A1,I3,I2,A2,A1,A2,
     * I3,
     * A3,A2,I3,A1, I3,A1,A4   ,2I3,2X)
       IF(NREC.GE.MXCT)       NREC=0;GØ TØ  88
       NREC=NREC+1
  500  RETURN
 88    CØNTINUE
       ENDFILE JTAPE
       ØUTPUT   'REQUESTING NEW ØUTPUT TAPE FØR YINØT'
       CALL MCVØL (JTAPE)
       GØ TØ 500
 600   CØNTINUE
       CALL YØLKI(
     1 ISR1,ISR2,KDA,KMØ,KYR,KHM,ISEC,ILAT,KSN,ILØN,KWE,IDEPT,IAMAG,IMB,
     2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
     3 ICE,IMG,IAUTH,IGHY,NPP,IØG,ILM,IS1,IS2
     4 )
       I=INDIC
       GØ TØ 411
 700   CØNTINUE
       CALL YØLKØ(
     1 ISR1,ISR2,KDA,KMØ,KYR,KHM,ISEC,ILAT,KSN,ILØN,KWE,IDEPT,IAMAG,IMB,
     2 ISØS,INTS,IDIAS,ITSU,ISEICH,IVØLC,INØNT,IWG,IFEG,IMS,IASP,IZH,
     3 ICE,IMG,IAUTH,IGHY,NPP,IØG,ILM,IS1,IS2
     4 )
       GØ TØ 500
 800   CALL YENDØ
       ENDFILE JTAPE
       GØ TØ 500
       END
```

```
                         HEX     DEC                                  HEX     DEC                                  HEX     DEC
NAME   TYPE CLASS        LØC     WØRDS     NAME   TYPE CLASS          LØC     WØRDS     NAME   TYPE CLASS          LØC     WØRDS
----   ---- -----     -------    -----     ----   ---- -----       -------    -----     ----   ---- -----       -------    -----
AMAG      R SCALR    *00286 V    DUMMY     DEPT      R SCALR      *00285 V    DUMMY     DLAT      R SCALR      *00281 V    DUMMY
DLØN      R SCALR    *00283 V    DUMMY     EVIL        SPRØG       EXTERN               GKEY      R SCALR       00272 V        1
I         I SCALR     0026F V        1     IAMAG     I SCALR       0026E V        1     IASP      I SCALR      *00292 V    DUMMY
IAUTH     I SCALR    *00296 V    DUMMY     IBAD      I SCALR       00270 V        1     IBLFC     I SCALR       00265 V        1
IBUF      I ARRAY     00001 V      400     ICE       I SCALR      *00294 V    DUMMY     IDEPT     I SCALR       0026D V        1
IDIAS     I SCALR    *0028A V    DUMMY     IFEG      I SCALR      *00290 V    DUMMY     IFLAG     I SCALR       00259 V        1
IIN       I SCALR     0025A V        1     IIØUT     I SCALR       0025B V        1     ILAT      I SCALR       0026B V        1
ILM       I SCALR    *0029A V    DUMMY     ILØN      I SCALR       0026C V        1     IMB       I SCALR      *00287 V    DUMMY
IMG       I SCALR    *00295 V    DUMMY     IMS       I SCALR      *00291 V    DUMMY     INDIC     I SCALR       00268 V        1
INØNT     I SCALR    *0028E V    DUMMY     INTS      I SCALR      *00289 V    DUMMY     IØQ       I SCALR      *00299 V    DUMMY
IPUN      I SCALR     0025C V        1     IGHY      I SCALR      *00297 V    DUMMY     IRLEN     I SCALR       00263 V        1
ISEC      I SCALR     0026A V        1     ISEICH    I SCALR      *0028C V    DUMMY     ISØS      I SCALR      *00288 V    DUMMY
ISR1      I SCALR    *0027A V    DUMMY     ISR2      I SCALR      *0027B V    DUMMY     ISW       I SPRØG       EXTERN
IS1       I SCALR    *0029B V    DUMMY     IS2       I SCALR      *0029C V    DUMMY     ITAPE     I SCALR      *00277 V    DUMMY
ITSL      I SCALR    *0028B V    DUMMY     IVØLC     I SCALR      *0028D V    DUMMY     IWG       I SCALR      *0028F V    DUMMY
IZH       I SCALR    *00293 V    DUMMY     JBLFC     I SCALR       00264 V        1     JBUF      I ARRAY       00191 V      200
JEE       I SCALR     00274 V        1     JNN       I SCALR       00273 V        1     JRLEN     I SCALR       00262 V        1
JTAPE     I SCALR    *00278 V    DUMMY     KDA       I SCALR      *0027C V    DUMMY     KGDAØ     I SCALR       0025E V        1
KGHMØ     I SCALR     00261 V        1     KGMØØ     I SCALR       0025F V        1     KGYRØ     I SCALR       00260 V        1
KHM       I SCALR    *0027F V    DUMMY     KK        I SCALR      *00279 V    DUMMY     KMØ       I SCALR      *0027D V    DUMMY
KSN       I SCALR    *00282 V    DUMMY     KWE       I SCALR      *00284 V    DUMMY     KYR       I SCALR      *0027E V    DUMMY
LGKEY     I SCALR     00276 V        1     LTKEY     I SCALR       00275 V        1     MCVØL       SPRØG       EXTERN
MXCT      I SCALR     00267 V        1     NDPS      I SCALR       00269 V        1     NPP       I SCALR      *00298 V    DUMMY
NREC      I SCALR     00266 V        1     NZERØ     I SCALR       0025D V        1     SEC       R SCALR      *00280 V    DUMMY
STAT        SPRØG     EXTERN               TKEY      R SCALR       00271 V        1     YBLKI       SPRØG       EXTERN
YBLKØ       SPRØG     EXTERN               YENDØ       SPRØG       EXTERN               YINØT     R SCALR       00000 V        1
YINØT       SPRØG     00000 P              YSETI       SPRØG       EXTERN               YSETØ       SPRØG       EXTERN


         HEX                HEX                HEX                HEX                HEX                HEX
LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC       LABEL    LØC
-----   -----      -----   -----      -----   -----      -----   -----      -----   -----      -----   -----
   53   000C1         65   00148         74   000CE         88   00167        400   0002C        410   0007A
  411   000A9        420   000E1        500   00166        577   000CE        600   0017C        700   001A4
  800   001CA


LØCAL VARIABLES (631 WØRDS):

   00000 YINØT      00001 IBUF       00151 JBUF       00259 IFLAG      0025A IIN        0025B IIØUT
   0025C IPUN       0025D NZERØ      0025E KGDAØ      0025F KGMØØ      00260 KGYRØ      00261 KGHMØ
   00262 JRLEN      00263 IRLEN      00264 JBLFC      00265 IBLFC      00266 NREC       00267 MXCT
   00268 INDIC      00269 NDPS       0026A ISEC       0026B ILAT       0026C ILØN       0026D IDEPT
   0026E IAMAG      0026F I          0027C IBAD       00271 TKEY       00272 GKEY       00273 JNN
   00274 JEE        00275 LTKEY      00276 LGKEY

BLANK CØMMØN (0 WØRDS)

ENTRY PØINTS:

   00000 YINØT
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EXTERNAL SUBPRØGRAMS REQUIRED:

    EVIL       ISW        MCVØL      STAT       YBLKI      YBLKØ      YENDØ      YSETI
    YSETØ      F:101      F:102      F:103      F:104      F:105      F:106      F:108
    9BCDREAD   9BCDWRIT   9ENDFILE   9ENDIØL    9IØDATA    9ITØR      9PRINT     9RTØI
    9SETLFN

HIGHEST ERRØR SEVERITY: 0 (NØ ERRØRS)

                       DEC        HEX
                      WØRDS      WØRDS
                      -----      -----
   GENERATED CØDE:     465       001D1
        CØNSTANTS:      10       0000A
  LØCAL VARIABLES:     631       00277
            TEMPS:      40       00028
                      -----      -----
    TØTAL PRØGRAM:    1146       0047A
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1. Gravity
2. Data Processing
3. Computer programs

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A summary and documentation of a family of computer programs that have been developed by the gravity group at the Woods Hole Oceanographic Institution is presented. The programs provide for format conversion, computation of the regional gravity field from spherical harmonic coefficients, selective data retrieval, graphic display, and construction of two- and three-dimensional structure models and the computation of the gravitational attraction of those models.

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A

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